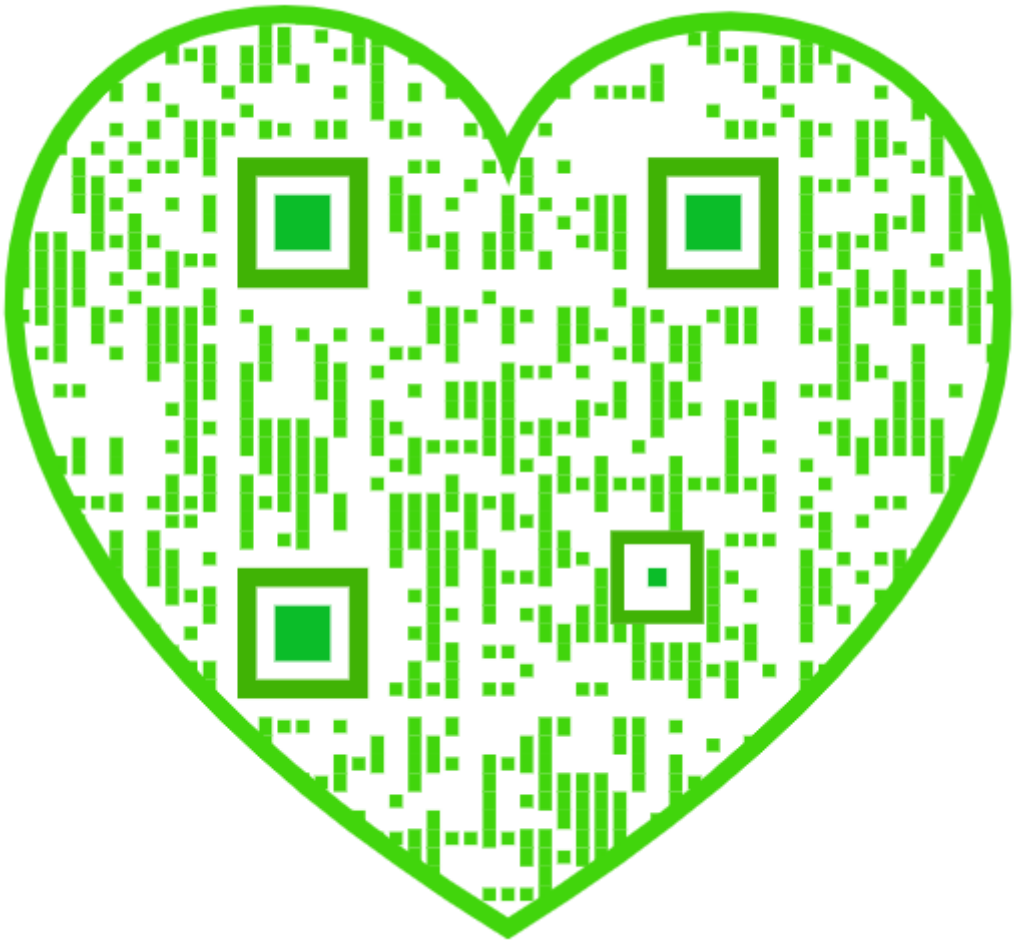
Adventurers
JUNIOR FOREST WARDENS

LEADER MANUAL

Woodstravel

MODULE



Supermarkets are all aright, but it's much more fun to shop for food in nature.

Introduction

Woodstravel is different from the other three modules (Forestry, Leadership and Ecology.) This is the module that Wardens will probably have the most interest in. To some Wardens this module is the most fun because "Adventure awaits!" and because it works toward the Wardens being independent outdoors.

Woodstravel provides opportunities for Wardens to develop and hone their outdoor skills, acquire knowledge that will help them play safe outdoors, and provide opportunities for Wardens to be together in fellowship with other Wardens.

There are many books written on the topics such as survival, campcraft skills and fire building. This Woodstravel module was written to give you some background information and suggestions for activities you can do with Adventurers. There is so much material out there that this module is not intended to re-write the already published material, but rather provide a guide for program development and presentation.

To teach the skills in Woodstravel, Leaders have to be able to perform the same skills required from the Wardens. It takes practice to light a fire in the rain, practice to know all the wild edibles and practice to build a comfortable shelter in the bush. It takes some skill to repair ski poles, snowshoe downhill and hike up a steep path. Leaders may use resource people to help teach some of the difficult skills, but developing and practicing skills prior to teaching them is a must.

The knowledge and skills in Woodstravel will give Adventurers confidence to learn and enjoy nature to the fullest. Since the Silver Tree program takes three years to complete, JFW clubs should ideally integrate Woodstravel skills and knowledge with the Forestry, Leadership and Ecology modules of your program.

This manual provides basic information written to provide a conceptual understanding. The best teacher, however, is first hand experience. If you do not have the personal skills to teach the Wardens, have experts visit your club to demonstrate and teach skills and knowledge. Always provide Wardens with opportunities to practice and hone their skills.

Footnote

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Framework

I. First Aide

First aid is a basic skill for all Junior Forest Wardens and leaders. Each club should ensure that all wardens and leaders have current training and practice first aid on a regular basis.

- ❍ Complete a St. John Ambulance or Red Cross emergency first aid course
- ❍ Demonstrate how to manage an accident and how to get help
- ❍ Construct and demonstrate how to use a first aid kit

II. Fire Lighting Techniques

Fire lighting are part of the survival techniques taught in the JFW program. Knowledge of fire safety and fire suppression are critical to protecting people, wildlife and our forests.

- ❍ Explain the needs of a fire while building a fire.
- ❍ Prepare a three-course meal over an open fire.
- ❍ Build and maintain a warming fire.
- ❍ Build, use and put out a no trace cooking fire.
- ❍ Demonstrate how to make three types of fires, at least one in winter or during wet, windy conditions

III. Outdoor Clothing

Risk of hypothermia is a factor in all Junior Forest Warden activities. By teaching wardens how to dress appropriately for the activity and the weather, wardens and leaders practice prevention, and accept responsibility for their own personal safety.

- ❍ Demonstrate how to use outdoor clothing to manage thermoregulation.
- ❍ Describe three types of clothing fabrics and the qualities of each page 41
- ❍ Give a 10-minute outdoor clothing lecture at school or to a Pathfinder group.

IV. Shelter

In an outdoor survival situation, the ability to find or make a shelter can mean the difference between comfort and discomfort, or surviving and not surviving.

- ❍ Construct and use a lean-to.
- ❍ Construct and use three types of snow shelters and/or shelters from natural products combined with plastic and nylon.
- ❍ Demonstrate two techniques for low-impact emergency shelters for use in natural areas.
- ❍ Demonstrate the proper location of shelters.
- ❍ Explain qualities and desirable features of tents

V. Navigation

The ability to use a compass and read a map accurately is an important skill in travelling in the woods.

- ❍ Identify the features on topographical maps and plot a course.
- ❍ Demonstrate orienting a map to the terrain.
- ❍ Demonstrate orienting a map with a compass
- ❍ Demonstrate techniques for setting a bearing and proper pacing.
- ❍ Demonstrate the use of a map and a compass on a trip in order to prove proficiency in staying found.

VI. Outdoor Safety

It is critical for outdoor safety to learn the potential hazards, how to prevent them and how to treat them.

- ❍ Demonstrate how to cope with two of the following in a camping and survival situation: sunburn, frostbite, hypothermia, dehydration, and wildlife problems.
- ❍ Describe emergency techniques to acquire water during a simulated survival situation.
- ❍ Describe six natural indicators of a storm and demonstrate the actions that should be taken.

VII. Responsible Hiking and Camping

As part of the Junior Forest Warden program, wardens and leaders are expected to use the out-of-doors responsibly. This role includes taking responsibility for personal safety and health.

- ❍ Demonstrate food packaging techniques. Describe how the packaging considers spoilage, food preservation and protection from wildlife
- ❍ Develop a cost-effective menu (not freeze-dried items) to feed a group of six for a week-long ski or backpack trip.
- ❍ Discuss the philosophy of leave no trace camping and demonstrate leave no trace camping in the following skill and knowledge areas: food preparation and cooking, fire building and fuel selection, shelter, and waste disposal.
- ❍ List ways you are responsible to and for others while planning a trip, during a trip and after a trip.

VIII. Knots and Lashings

Learning common knots and lashings and determining when to use them are skills that will aid in shelter construction, survival techniques, first aid and outdoor recreation activities.

- ❍ Make a shelter or an outdoor tool using cords and demonstrate the proper use of three knots and two lashings.
- ❍ Construct a knot display board which includes the name and use for at least eight knots.
- ❍ Make cordage out of natural materials.

IX. Survival

Making and learning how and when to use a survival kit is taught through the aid of survival situations.

- ❍ Describe factors affecting survival
- ❍ Describe the priorities of survival
- ❍ Practice a pattern for staying alive for one full day. Demonstrate proficiency in the use of map and compass, shelter, fire, selection of food sources, natural navigation aids, emergency first aid, signals, and dealing with boredom.

X. Search and Rescue

From searching for a lost article to participating in a search and rescue simulation, wardens learn an invaluable skill.

- ❍ Conduct a mock preliminary search for a person lost at camp.
- ❍ Conduct a mock secondary search using the containment and confinement methods.

XI. Outdoor Equipment

Learning the proper use of camping equipment contributes to a safe campout.

- ❍ Demonstrate how to light a camp stove.
- ❍ Demonstrate how to make a candle lamp or light a lantern.
- ❍ On a campout, describe the advantages and disadvantages of using stoves and fires.
- ❍ Describe how to select two of the following: daypack, backpack, sleeping bag, tent and canoe paddle.

XII. Daytrips and Campouts

Through participating, planning and leading a variety of daytrips and campouts, wardens have the opportunity to practice the skills they have learned in real-life situations

- ❍ Participate in nine daytrips.
- ❍ Participate in six campouts.
- ❍ Demonstrate an intermediate level of skill in two and a beginner level in one of the following: hiking, canoeing, cross-country skiing, or snowshoeing..

LEADER MANUAL

I FIRST AID

First aid is a basic skill for all Junior Forest Wardens and leaders. Each club should ensure that all wardens and leaders have current training and practice first aid on a regular basis.

date completed	✓		
_____	☐	Complete a St. John Ambulance or Red Cross emergency first aid course	page 3
_____	☐	Demonstrate how to manage an accident and how to get help	page 5
_____	☐	Construct and demonstrate how to use a first aid kit	page 8

I. First Aid

1. Complete a St. John Ambulance or Red Cross emergency first aid course.

Research indicates that once individuals take a First Aid course, the incidence of injury decreases by 40 percent.

St. John Ambulance

The volunteers from St. John Ambulance Brigade provide first aid services to groups and organizations upon request. The St. John Ambulance mission is to enable Canadians to improve their health, safety and quality of life by providing training and community service.

Registration

Course prices include materials, registration and instructional fees. Course prices are subject to change without notice. Refer to the Yellow Pages section of this program for the St. John Ambulance branch locations.

Program Summary

Emergency Fist Aid (includes Level A CPR)	6.5 hours
Emergency First Aid (Level B CPR)	10 hours
Standard First Aid(includes Level A CPR)	13 hours
Standard First Aid with Basic Rescuer CPR (Level C)	16 hours
Extended First Aid (includes Level C CPR)	20 hours
Standard First Aid Re-certification	6.5 hours
Standard First Aid with Basic Rescuer CPR Re-certification	8 hours
First Aid in the Wilderness	16 hours

There are more programs in areas of CPR, advanced first aid skills, children, and in the workplace. Contact a St. John Ambulance office for more information.

CPR

All cardiopulmonary resuscitation (CPR) modules and courses are taught to St. John Ambulance national standards which are in accordance with those set by the Heart and Stroke Foundation of Canada.

Certification

All First Aid courses are certified for three years. It is recommended that CPR be re-evaluated annually.

Red Cross

The Canadian Red Cross teaches people of all ages that they can do something to help in an emergency.

Program Summary

Emergency First Aid . . . . . .6-8 hours
Standard First Aid . . . . . .15-18 hours
Heartsaver . . . . . .3-4 hours
Heartsaver Plus . . . . . .4-6 hours

Refer to the **Phone Book Yellow Pages** in this program for contact information for the Red Cross and St. John Ambulance.

2. Demonstration how to manage an accident and how to get help.

Background

Each accident will be a different situation. The key to responding to an emergency is to remain calm, access the situation carefully before acting and continue to reassess.

The basic approach for handling an emergency is:

1. Assess the situation - Determine the extent of the emergency and what response is required. Do you have to administer first aid or coordinate a search for a lost person?
2. Develop a response plan to suit the emergency. For example, give first aid or initiate a search or send someone for help.
3. Assume leadership or select someone to be the leader who will delegate responsibilities. Group members cooperate with delegated duties.
4. Take care of the victim. Make comfortable and protect from weather conditions.
5. Keep a trained first aid person with the victim at all times to monitor wounds.
6. Give group members something to do to keep their mind off the situation. For example, have a fire made, make some hot drinks, get more wood and so on.
7. Check all group members. Is anyone suffering from shock or emotionally distraught. Maintain group morale.

Getting Help

When you send a person for help, follow a mutually agreed upon plan. The plan may differ depending upon where you are when the accident happens.

In the Urban Jungle

- Choose someone to go and telephone 911. It will be a free call on any pay phone.
- Give the person a brief summary of details which they must tell the 911 operator. For example, "There was a bike and car collision. We have an unconscious male, approximately 15 years old, with a green stick fracture and extensive bleeding. Please send an ambulance to the corner of Hit Avenue and Run Street."
- Have the person repeat everything you told them to say and do.
- Tell the person to report back to you when finished. Tell

them to say it, "I will come back here and tell you what I did."

- Wait a reasonable time (10 to 20 minutes) for the person to return. Consider sending another person to telephone 911. Follow the same procedure.
- Wait for emergency response and professional help to arrive at the accident scene.

In the Wilderness

- Determine where you go for help. Pre-trip planning should already provide a location for you to go for help. It may be a ranger station, cottage house or road but keep in mind there may be no phone or car.
- Someone must stay behind. This person must be briefed as to what is expected, for example, stay put-do not move your location or move to a shelter or road. If the group moves unexpectedly, a note must be left with the following information: planned route, destination, time departed and estimated time of arrival.
- Ask for Help. There may be other groups or travellers in the area who may be able to assist with first aid. Be clear with instructions to new people coming into the situation, for example, will they take over first aid treatment?
- Leaving for help. If anyone has to leave, it should be three people. They must have the skills and knowledge to leave safely. Follow this procedure:
  1. Use a map to determine the best route to get help.
  2. Pack only necessary equipment (map, compass, directions, food, water, clothing) and be prepared to bivouac.
  3. Determine what the group staying behind will do if help does not arrive by a certain time.
  4. Travel quickly and efficiently. Do not become another victim by getting hurt.
  5. The three going for help should never be split up.
  6. Conserve strength because you may need to lead the rescue party back.
  7. Contact authorities and arrange for a rescue. What will you do, stay or go back with rescue party.

- Have information for medical assistance to help with evacuation. Include name and age of victim(s), initial condition of victim, when and how accident occurred, first aid administered, location of group (on map), first aid equipment at site, type of rescue or help needed.

If You Are Alone

If an accident happens and there is just you and the victim, follow this procedure:

- Assist the victim with the necessary first aid.
- Make the victim comfortable. If possible and if necessary, move the victim away from the accident site if it poses further danger to a safer place.
- Tell the victim if conscious, that you are going for help and will return.
- Procedure as above depending on your location, in the wilderness or in the city.

Activity Ideas

- On a daytrip, set up a scenario where Adventurers must assess an accident scene, administer first aid, go for help and delegate duties. This is an opportunity for Wardens to use map and compass skills, first aid, fire lighting and leadership skills.
- Set up a fictitious accident at meeting time. Have the group assess the situation and send someone for help.

3. Construct and demonstrate how to use a first aid kit.

A first aid kit can be custom-made for the activity. For example, a first aid kit for a car and home can be quite extensive. One for a backpacking trip may include only the necessities such as moleskin for blister and hot spots on the feet and it may include insect repellent.

A first aid kit should be compact in size and have the most important contents ready for any situation. Below are some items that may be included for various situations:

Hiking First Aid Kit

- tweezers
- Wound management: butterfly closures (2), antibiotic cream, antiseptic towelets, moleskin
- Medications: antihistamines, sting relief swabs
- Bandage materials: 3" X 3" sterile dressings (4), roller gauze bandage, elastic bandage, tape, Q-tips, strip and knuckle bandages
- Infection control: latex gloves, anti-microbial hand wipes, biohazard waste bags (for soiled dressings)
- safety pins
- Other: band-aids, hay fever and headache medication
- mirror

Family First Aid Kit

- Basic medical instruments: thermometer, bandage scissors, tweezers
- Wound management: butterfly closures (4), antibiotic cream (Neosporin), antiseptic towelets, moleskin, instant cold pack, Tincture of Benzoin (prepares skin for application of adhesive)
- Medications: ipecac syrup (induces vomiting), acetaminophen chewable tablets (for sore throats), Extra Strength Tylenol (for headaches, fever, muscle aches), hydrocortisone itch cream (5% steriod ointment for severe skin reactions), A and D ointment (for sunburn), antihist-amines (Benadryl, for allergic reactions), soothing sting relief swabs, cough suppressant

- Bandage materials: 3' X 4" sterile dressings (6), non-adherent 3" X 4" dressings (4), roller gauze bandage (2), 1" adhesive tape, strip and knuckle bandage, Q-tips
- Infection control: latex surgical gloves, anti-microbial hand wipes, bio-hazard waste bags
- safety pins, plastic bag

  mirror

Knowledge of the appropriate treatment and the effects of drugs is necessary when dealing with pain killers, antibiotics and other related substances. If you are planning an extensive kit, consult a medical professional.

- analgesic tablets (aspirin, Tylenol)
- caladryl lotion (a calamine and Benadryl lotion to relieve minor skin irritation)
- motion sickness drug (Gravol, Marezine)
- diarrhea medication (Immodium-AD)
- antacid (Maalox, Pepto Bismol, for stomach indigestion)
- stimulant
- pain medication
- muscle relaxant
- sting soother
- oil of cloves (toothaches)
- sunscreen cream, zinc oxide ointment
- assorted bandage compresses
- triangular bandage
- elastic bandage
- thermometer
- scissors
- single sided razor blade
- tweezers

Miscellaneous

- insect repellent
- parachute cord
- heavy duty aluminum foil
- safety pins

- petroleum jelly (Vaseline), can be used for lip balm and as lotion
- duct or heavy plastic tape
- dental floss
- mosquito head net
- notebook and pencil
- travellers cheques
- identification
- coins for telephones and emergency phone numbers
- pocket-sized survival manual
- military-type can opener (very small)
- space blanket
- waterproof matches
- mirror

Activity Ideas

- Have Wardens make a First Aid kit to fit a sandwich sized zip-lock bag or a pencil case.
- Have Wardens make a first aid kit for various situations and places such as: club meetings, their homes, a car, a personal kit, a group kit, an overnight hike, a week long backpack trip, a canoe trip, an overnight trip during the winter, a bicycle, a day long cross country ski trip.
- Have Wardens bring in the first aid kits from home, cars and so on and evaluate their contents. Do materials need to be replenished? What else could be added. Discuss and evaluate all the kits.
- Visit various sites (school, church, camp) and ask to evaluate their first aid kits. Evaluate the kits' contents and if necessary, make recommendations to the site for improvements.
- Visit a drug store and calculate the cost for materials that make up a basic first aid kit.
- Compare the contents and cost of an already assembled basic first aid to a first aid that Wardens can purchase and assemble themselves.
- Have Wardens review all the items in a basic first aid kit and discuss how each item can be used in emergency situations.

- Have Wardens review how to complete an accident report form. If you do not have access to this form, decide what a report should include (the 5 Ws and How.)
- Have Wardens practice planning and delivering a presentation by teaching younger Wardens about first aid kits.

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II. FIRE LIGHTING TECHNIQUES

Fire lighting is one of the survival techniques taught in the JFW program. Knowledge of fire safety and fire suppression are critical to protecting people, wildlife and our forests.

date completed	✓		
_____	☐	Explain and demonstrate the steps in starting a successful fire.	page 15
_____	☐	Prepare a three-course meal over an open fire.	page 19
_____	☐	Build and maintain a warming fire.	page 26
_____	☐	Build, use and put out a no trace cooking fire.	page 27
_____	☐	Demonstrate how to make three types of fires, at least one in winter or during wet, windy conditions	page 29

II. Fire Lighting Techniques

1. Explain and demonstrate the steps in starting a successful fire.

Stages in Fire Lighting

There are four basic stages in fire lighting:

1. Ignition - The most common way to start a fire is with matches. Others are the flint and steel and the bow drill.
2. Establishment - This stage involves using the most effective method to light the required type of fire with the fuel available. Fine and coarse kindlings are ignited, which in turn ignite sufficient fuel of the right quality so the fire will continue to burn even in wind or rain. Establishment is a critical aspect of firelighting under adverse conditions as there are often many problems to overcome.
3. Application - Fire arrangements vary depending on the application and fuel available. There are fires for cooking, warming, drying, repelling insects, signal fires and so on.
4. Maintenance and Moderation - A fire can be made to burn at a desired output with a minimum of smoke. Knowledgeable maintenance will allow you long periods between adjustments or stokings.

Kindling

Kindling is any material that will light easily with the application of a flame. Kindling is not the same as tinder. Tinder is a material that will glow when a spark lands on it, specifically by a flint and steel or rock. The tinder is combined with a fine kindling to produce a flame with a breath or the wind.

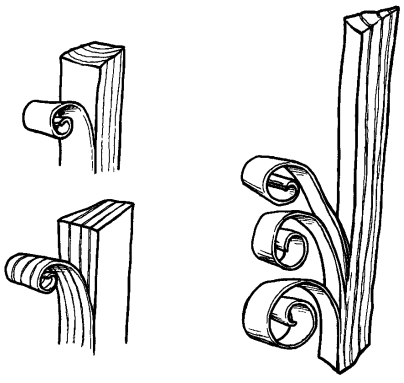
If the kindling is too close together the mass of the material in the kindling absorbs too much of the match's heat before it can be effective and it physically obstructs oxygen access. The oxygen-combustion vapour mixture is then too lean to catch fire and produces only smoke. If the convective heat is not allowed up through the kindling because it is a dense mass, its drying and pre-heating action is less efficient.

It is also helpful to light your kindling well off the ground. The coolest, dampest air is near the ground and there is also more obstruction to the flow of needed air to the site of combustion.

The best fuels are the ones that are high in carbon and hydrogen content. The most common elements in all living things are carbon, hydrogen, oxygen and nitrogen. Oxygen is not a fuel but it supports combustion. Nitrogen is not a fuel and it does not support combustion, in fact, it tends to interfere with oxygen. Combustion ceases when the oxygen level drops below 15 percent.

Types of Kindling

- Pine Needles - When pine needles are at least partly red, they can burn as well as birch bark. Use a compact but not tight bundle of needles.
- Birch Bark - This is the best kindling in the boreal forest. The bark contains an oily substance that makes the bark impervious to moisture and causes the bark to burn with considerable intensity. Finely or coarsely shredded bark is easy to ignite in any weather.
- Inner Bark of Black Poplar - This is an excellent rare kindling when dry. It is found on trees cut down by beavers in winter and early spring. The inner bark of aspen is also good but of a poorer quality than black poplar.
- Dry Grasses - This is a good kindling and is readily available in winter and scarce in summer. Dry grass is the best kindling for the flint and steel method of firelighting.
- Old Man's Beard - This is not a good kindling in wet weather, it absorbs moisture. It is fairly good to use in winter and can be easily dried when placed inside a shirt for a couple of hours. In dry weather it burns like gasoline. It is good enough to use with bow drill and the flint and steel methods.
- Feather Stick - Use a thumb-sized piece of knot free wood. Support the bottom of the stick on the ground or a log and cut with the grain. Shave the edges down as thinly as possible. A minimum of six feather sticks will start a good fire.



- Wood Scraping - These are small pieces of wood scraped off instead of

shaved off a piece of wood. Willow can be scraped into a fluffy mass of material that will ignite from an ember.

- Dead Pine Branches - Dead lower pine branches, if snapped off near the trunk of the tree, are often saturated with resin. The brittle resinous wood can be chipped and made in into fine feathers.

Manufactured Kindlings

- Fire Kisses I - Take a fl inch square of paraffin wax and wrap in brown paper like a candy kiss. Dip the whole thing in paraffin wax.
- Fire Kisses II - Cut a strip (about one inch wide) from a heavy brown grocery bag. Tie in a knot and dip in paraffin wax.
- Super Match - Use a large wooden match that will strike anywhere. Wrap thin string or heavy thread (embroidery thread will work) around the match stem halfway up. Dip the whole match into paraffin wax to waterproof and hold the string in place.
- Tentest Fire Tinder - Use a two inch square of tentest approximately⁄inch thick. Soak the tentest in liquid paraffin wax and place in survival kit. When needed, shave off pieces and use the shavings as kindling.
- Egg Carton Fire Starter - Use the egg cartons made of paper pulp instead of the foamed plastic ones. Fill each egg holder with dryer lint or cotton balls and fill with melted paraffin wax. When cooled, break apart and place one in a survival kit.
- Tuna and Cardboard Candle - Use a cleaned, empty tuna can. Cut strips of corrugated cardboard the width that the tuna can is deep. Coil the cardboard strip(s) around a wick. Keep coiling and place snugly but not too tight into the can. Fill with melted paraffin wax. Can use as a candle to start a fire.
- Electric Fire Starter - Use any sized battery from a flashlight, a 9-volt radio, or a car battery. Place steel wool between the + and - terminals, the steel wool will heat up and start to burn.
- Flint and Steel Kits - Use dryer lint or cotton balls and flint and steel. Place both in a film container or pill bottle.

Caution:

When heating paraffin wax, use a tin coffee can in boiling water The risk of fire is greatly **increased** if the tin can is directly on the fire or element.

Kinds of Wood for Fuel

- Willow - Very tolerable smoke, good coals, easy to gather but comes in small pieces.
- Aspen - Comes in bigger pieces but is a little smokier than willow.
- Alder- the smoke is pleasant, may even relieve headaches, can be broken into stove wood lengths but burns fast.
- Black Poplar Outer Bark - exceptionally good coals but burns up quickly.
- Pine, Black & White Spruce - Smoke induces headache, wood is sparky (especially black spruce)
- Tamarack (Larch) - Produces the most heat of all woods but is not common.
- Birch - Seldom found dry, it's either green or rotten and like aspen must be burned in the green state when other fuel is scarce.
- Driftwood - regardless of origin, tends to burn fairly hot and fast. Sodden (dripping wet) driftwood is very hot once ignited.

Fires are like humans, they thrive on attention.

Common Errors With Fires

- Fire is too small.
- Wood is too thick.
- Not enough fine materials to start fire.
- Wood is packed too closely together.
- Wood is too widely spread apart to produce effective inter-reflective action.
- Allowing a cavity to develop under long logs as they burn.

Tips

- The cure for a smoky fire is to add more good fuel.
- If you want an irritating smoky fire for signal or insect control, use green pine, spruce or punky wet wood.
- A good fire thrives on attention, adjust frequently.

Activity Ideas

- Set up a hot plate and melt paraffin wax in a double boiler. Have a night of making super matches and Fire Survival Kits (one fire kiss, one super match, both in an empty plastic film container)
- Have the club collect and save dryer lint for several months. Find some paper egg cartons and make egg carton fire starters.
- Make a variety of manufactured kindlings. Test and compare the effectiveness of these. Discuss the best application for each

2. Prepare a three-course meal over an open fire.

Building a Cooking Fire

A cooking fire can be a small or as large as the number of pots required to feed the group. Pots can be supported over the flame with grills, rocks or by suspension from lashed sticks.

Clean Pots

If you rub liquid dish detergent over the outside of your pots, soot from the fire will adhere to the pot but it will easily wash off with minimal scrubbing.

Suspending Pots

An ideal suspension system must be safe and easy to raise and lower a pot to control heat. Most quick rigs consist of three components: the suspension, the pivot and the anchor.

The anchor secure the far end of a suspension pole. The anchor must be secure so that it will not release accidentally. The pivot can be adjusted according to the situation. The suspension holds the pot or a pot hook over the fire. It should have a notch for the pot handle. If a suspension pole is too close to the fire, it will burn up. A tripod is useful as a pivot when the ground is frozen or rocky.

Three Course Meal

A three course meal may consist of soup, entree or main course and dessert. There are many books on the topic of outdoor cooking. Keep a record of your favourite recipes, how they were cooked, length of time and how many the recipe fed.

Dutch Oven Cooking

A Dutch Oven is a black cast iron pot with a cover. The pots come in a variety of sizes and are very heavy. Cast iron requires a certain amount of care. Most types of cast iron pots must be seasoned. Seasoning is a way of protecting the pot for many years of service. First, scrub the inside of the pot with steel wool and a bit of soap. Continue until the water is clear. Wipe and dry then apply a thin layer of cooking oil to the inside and outside of the pot. Place in an oven set at 250° for two to three hours. It's ready to use. After each use, clean the pot and apply a thin layer of oil to the inside to prevent rusting. Never soak your Dutch Oven in detergent as it will remove all the seasoning.

Cooking with a Dutch Oven

When you start top cook with Dutch Oven, experiment with various types of recipes, for example, try cooking vegetables, a cake, or a chicken. A good size is a 10" or 12" diameter.

The principle when cooking with a Dutch Oven is to maintain a constant heat with coals. If you are at camp, use Matchlight™ Briquettes. They light easily with a match. Move them around the pot when they are gray. The coals or briquettes should never be put under a Dutch Oven, you will burn the food. The coals are placed around and on top of the Dutch Oven. Cooking time is approximately the same as with your oven at home.

Coal Cooking

The fire for coal cooking must provide coals from the wood. Hope you are not in a hurry--it takes time to cook with coals. Some of the best coals are from the black popular, two to three cm thick. Finger-thick willow or aspen sticks also produce coals.

Use coals to cook food in Dutch Ovens or wrap food in tin foil and place on top of coals. Use two layers of light-weight or one layer of heavy-duty aluminum foil. The foil should be large enough to go around the food and allow for crimping the edges in a tight seal.

When the tin foil is folded, make a double fold over on all seams so the juices will not leak out of the foil package. This is known as the drugstore wrap

Some Recipes

Bannock

1 cup flour

2 tsp baking powder

1/8 tsp salt

1/2 cup cold water or milk

1 Tbsp butter or margarine

Mix all ingredients to make a stiff dough for cooking on a stick to a runny dough for frying. Add oil to pan before frying. Serves two people.

- Recipe from Bush Craft by Mors Kochanski.

Bannock is baking powder bread.

Bannock

4 cups flour

6 Tbsp sugar

1 tsp salt

4 tsp baking soda

1/3 cup oil

milk or water

Mix the dry ingredients. Cut in 1/3 cup oil or butter with a fork, adding small amounts of water or milk until the dough gathers into a ball. Flatten into a pancake, not more than one inch thick. Fry until golden brown.

Bannock

4 cups flour

1/4 cup powdered milk

2 Tbsp shortening

1 1/3 cups warm water

1 tsp salt

1 Tbsp yeast

1 tsp sugar

Seasonings (optional)

Combine all dry ingredients. Add anything you like such as raisins, dried fruit or cinnamon. Cut in shortening, add water and mix to form a dough. Fry in a pan or make a sausage on a stick and cook slowly over an open fire. Delicious spread with jam.

- Phyllis McBride author of Cactus Cooking
member of AJFW Alumni

Dutch Oven Peach Cobbler

1-11/2 quarts fresh peaches, peeled and sliced	1 Tbsp margarine
1/2 cup water	3/4 cup white sugar
1⁄4 cup brown sugar	1/2 tsp salt
1⁄4 tsp cinnamon	2 Tbsp instant tapioca
2 cups biscuit mix, plus 1/2 cup	2 Tbsp dry milk powder
1⁄4 cup shortening	2/3 cup water

Place sliced peaches in Dutch Oven and dot with margarine. Add water. Add sugars, salt and cinnamon to peaches and toss to coat peaches. Sprinkle tapioca over fruit. In a small bowl mix milk powder, 2 Tbsp sugar and shortening to biscuit mix. Add water and stir until mixture holds together. Spread the fi cup of biscuit mixture on tin foil and add rest of biscuit mixture. Knead dough working in the dry mix. Pat the dough into a circle big enough to fit onto the fruit in the Dutch Oven. Cut some slits on the crust to allow steam to escape.

Place Dutch Oven with coals or briquettes around and on the cover. Cook for 15-20 minutes. The time will vary depending on weather and wind conditions. The crust should be brown on top. Let it cool, serve and enjoy.

- Recipe from Camp Cooking by Bill and Jo McMorris

Foil Breakfast

sausage

egg

hash brown potatoes

salt, pepper, spices to taste

Place potatoes, egg, sausage patty and spices in foil. Wrap securely. Place on coals for 15 minutes.

Foil Dinner

potato slices	dab of butter
hamburger patty	salt, pepper
onion slices	
carrot slices	

Lay potatoes, onion, carrots on a sheet of heavy-duty foil then place the hamburger patty on top. Cover with slices of vegetables again. Season with butter, salt and pepper. Cook 20 to 30 minutes over hot coals, turning twice during cooking.

Meat Loaf in a Dutch Oven

2 lbs ground beef

a small can evaporated milk or 1/2 cup milk

2 packages dried onion soup mix

Mix all ingredients together and form a loaf in the Dutch Oven. Bake approximately 50 to 60 minutes.

Cinnamon Raisin Roll-Ups in a Dutch Oven

2 cups Bisquick mix

1/2 cup raisins

1/2 cup sour cream

3 Tbsp milk

1/4 cup packed brown sugar

2 Tbsp margarine

1/4 cup chopped nuts

1/2 tsp ground cinnamon

2 Tbsp melted margarine

granulated sugar

Spray Pam or oil inside of Dutch Oven. Mix baking mix, raisins, sour cream and milk, beat 20 strokes. Smooth into ball on floured tin foil or wax paper. Knead 10 times. Roll into a rectangular, about 12" X 10". Spread with softened margarine. Mix brown sugar, nuts and cinnamon and sprinkle over dough. Roll up tightly. Pinch end of roll. Cut into 12 slices. Places slices, cut side down, on piece of tin foil. Brush melted margarine over tops and sprinkle with granulated sugar.

Prepare Dutch Oven by crushing up tin foil into three or 4 balls and place on bottom of Dutch Oven. Place Tin foil sheet with slices on top of tin foil balls. This will prevent the rolls from being burned because the air space under them distributes the heat more evenly. Bake until golden, about 13 minutes.

You can use aluminum pie pans on top of your single burner stove. The two pie pans are secured together with clothespins.

Clothes Pin Biscuit Ring or Pie Pan Oven

1 1/2 cups Bisquick

1/3 cup cold water

two 8" aluminum pie pans

3 to 4 wooden clothespins, soaked in water

5-6 Tbsp shortening

In a small pot, mix the Bisquick and water with a fork until the combination is well blended and sticky. Put 2 to 3 tablespoons of vegetable shortening in one of the pans and place on the stove to melt. Grease the other pie pan thoroughly. Spread the dough around the edge of the pan of melted fat, leaving the centre clear. Put the other pan on top of the dough. Line up the edges of the pans together and fasten together with clothespins. Establish a steady, low flame on the stove, put the pans on the burner to bake. Bake the bread about four minutes on one side, then invert the pan oven and cook the second side for another 4 to 5 minutes. Continue to bake another 6 to 8 minutes, alternating the sides every 3 to 3 minutes. Take the pan off the stove to check for doneness. Cut into wedges and serve with honey or jam.

Blueberry Bread

one 17 oz pkg Blueberry muffin mix

4 Tbsp dry milk powder

1/2 cup cold water

4 to 6 Tbsp shortening

Follow the same method as for Clothes Pin Biscuit Ring or Pie Pan Oven.

Try This at Home

Beef Jerky

1 lb. (454 g) sirloin or tip round steak, 2.5 cm thick

1/2 cup (125 ml) water

1 1/2 oz. (42 g) envelope of dry onion soup mix

1 tsp (5 ml) liquid smoke

1⁄4 tsp (1 ml) garlic powder

1⁄4 tsp (1 ml) salt

1/8 tsp (0.5 ml) pepper

1 plastic zip lock bag

Cut off all the visible fat from the meat. Cut the meat into long strips about 1/8 inch (3 mm) thick. This is easier to do if you partially freeze the meat first. Put the strips into the plastic bag.

Measure the remaining six ingredients into a small bowl and pour them into the bag and onto the meat. Remove as much air as you can from the bag. Seal with a twist tie. Squeeze to get all the beef wet with the marinade. Place the bag in your refrigerator for at least six hours, turning occasionally. Heat the oven to 150° F (65° C). Remove the beef from the marinade. Blot with some paper towels. Place the wire rack in the cookie sheet. Put the meat strips on the rack. Dry the strips on the centre rack in the oven for four hours. Turn the beef strips over with a tong. Put the strips back into the oven for three to four more hours until the strips begin to get brittle. Take them out and cool completely. Store in the refrigerator or freezer.

3. Build and maintain a warming fire.

Warming Fire

The wall back fire, formerly known as the reflector and re-emitter fire, is a fire for warmth. A fire in an open area emits radiant energy in all directions. With a wall back or log wall a considerable portion of this radiant energy can be redirected in a more useful direction, thereby using the fuel more efficiently.

The wall back fire described below was evolved through Mors Kochanski's considerable use and experience. Built properly, it is like a large fireplace radiating heat and light.

If it is not very cold, the wall back is built of green logs so that it lasts longer. A commonly available slow burning green wood is black poplar (Populus balsamifera).

Logs 25 to 30 cm in diameter should last at least one night for any condition above -20° C. The colder the weather the more massive the reflector should be. If the weather is very cold, then the wall back can be built of dry logs, which become a source of fuel themselves; their burning surfaces tend to radiate more intensely than green wood. This type of fire may have to be rebuilt or readjusted as well as being stocked every four to six hours.

If very large logs, 40 cm, are used then a wall three logs high is adequate. With smaller logs, four logs high is more satisfactory in performance. Ideally the wall back should be about as high as the waist of the user.

A simple measure for the length of a log used is the distance from fingertip to fingertip. For more stability, the logs can be hewn flat, on the top and bottom, an operation more conveniently done before the logs are cut into sections. With the three log wall back fire, a brace can be used to hold the stacked logs in place by its weight, or logs may be piled behind the reflector for added support.

The wall is usually built vertically. If the log wall is leaned toward the fire so that if it collapses, it will fall on the fire, and a few stoking sessions in the night may be avoided.

The wall back fire must be built parallel to the wind. The wind direction may vary 15° or so either way, but it must blow across the front of the log wall to properly carry away the smoke and sparks. It is not the heated air that keeps you warm in this instance. It is the radiant energy that you

intercept that warms you, much like the warmth you receive from the sun. It should be noted that the fire must be built against the face of the wall for maximum effect.

4. Build, use and put out a no trace cooking fire.

Background

We can have fires where there is no visible trace left. The following methods are traditionally used to leave no trace:

- Never use rocks to ring a fire unless there is a fire ring already existing. A fire will permanently blacken rocks.
- Dig up the top sod and put aside. Dig down approximately 15 to 20 cm to the mineral soil. Put the mineral soil to the side.
- Burn fire down to an ash. Soak with water.
- Replace organic soil. Place sod back on top. Scatter with organic debris such as cones and twigs to disguise the spot.

The disadvantages though are that a fire will kill microorganisms in organic soil that are responsible for breaking down organic matter. The upper part of the pit dug down to the mineral soil will be sterilized and roots and other organic material on the sides of the pit may smolder after the fire is out and buried.

Mound Fire

A mound fire can be built anywhere, on top of the ground or on top of a camp's makeshift kitchen counter. All you need is a trowel or shovel, a large stuff sack and a round cloth which is optional.

- Locate a good source of mineral soil. Collect soil from an already disturbed area, for example, a stream bed, beneath tree roots or sandy areas.
- Fill the stuff sac with the mineral soil.
- Carry the soil to the fire site.
- Lay the ground cloth down and create a circular, flat-topped mound with the mineral soil about 15 to 20 cm thick. The mound's circumference should be larger than

the planned fire size. The ground cloth is not essential but helps with cleanup after the fire is out. The soil mound insulates the ground from the heat of the fire.

- Build the fires on top of the mound. The heat may kill the grass underneath but it will not sterilize the soil.
- Let the fire burn down to a white ash before dousing with water. When the fire is out, all the wood should be burned completely. Do not put your hands into the ash after it has been doused with water. Ash and water make caustic lye which can give you chemical burns.
- Scatter as much ash as possible and return the mineral soil back to its original location.

Fire Pan

A fire pan is a metal pan that is placed on the ground upon which a fire is built. When finished, bury or scatter the ashes.

Fire Stoves

A simple wood burning stove is more effective than an open fire. There are a number of commercially produced fire stoves ranging from simple, collapsible boxes to units with battery-powered fans, and petroleum-fueled stoves. If wood is scarce, use petroleum.

5. Demonstrate how to make three types of fires, at least one in winter or during wet, windy conditions.

Background

When starting a fire in cold weather, the pile of finger or wrist thick sticks piled on top of the burning bundle should be at least knee high. This will produce enough heat and coals to start the fire properly so that when any fuel is added it starts to burn immediately with a minimum of smoke. Starting a fire properly is particularly important when only poor fuel is available. A common error is using too large pieces too soon.

Fires are much like humans, they thrive on attention. Frequent adjustment of a fire will keep it going at its best. The adjustments usually consist of:

- moving together pieces of fuel that are too far apart
- parting the pieces that are too close together
- filling voids under the fire
- putting fuel into the thermal column early enough for pre-drying and pre-heating.

Often, the cure for a smoky fire is simply proper adjustment. A spread-out fire with inferior fuel always smokes.

Trench Fire

A trench fire is good in times of drought, windy weather or where the ground is strewn with dry leaves or pine needles. Dig a trench in line with the prevailing wind to create a good draft. The windward side should be wider and deeper and sloped upwards on the far end. Place rocks on sides as they will retain heat and also boulster the walls which have a tendency to crumble when the earth dries due to the heat. A small chimney of flat stones or sod on the leeward side will improve the fire.

Teepee Fire

A teepee fire is made by forming a teepee of kindling around the tinder bed. In windy weather, the teepee can be put against a log on the lee side. Larger fuel pieces are added to

the teepee to maintain its shape. As the fuel underneath burns down, fuel is added underneath. The teepee fire needs goes regular adjustment.

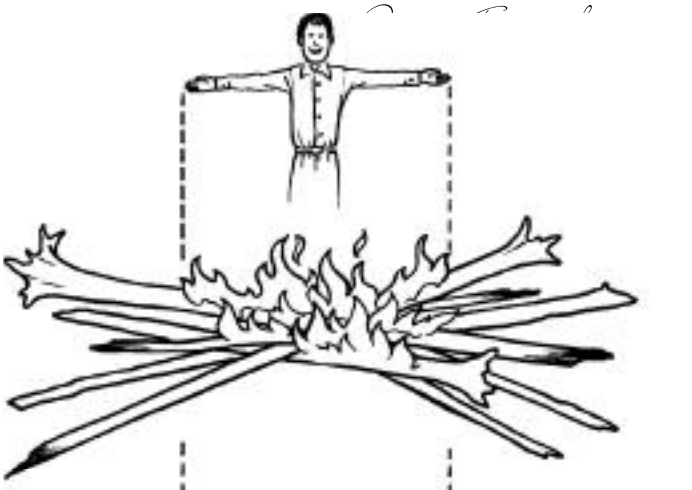
Log Cabin Fire

The log cabin gets its name because the larger fuel is laid like the alternating pattern of logs of a log house. The size of the log cabin pattern can be large at the bottom and become increasingly smaller as the fuel gets higher. As the fire burns down, fuel is added in the overlapping log cabin pattern.

Other kinds of fires that are covered in other areas of this program include: Cooking Fire, page 19; Warming Fire, page 26; No Trace Fire, page 27; and Signal Fire, page 116.

Fire on Top of Deep Snow

In winter, pile of fuel should be at least knee high. Start by building a platform made from green logs on the snow. The platform can have two layers, each layer laid in opposite directions. The fire is made on top of the platform. The best fire for winter is the parallel log fire. It should be hot enough so that you have to take one step back.



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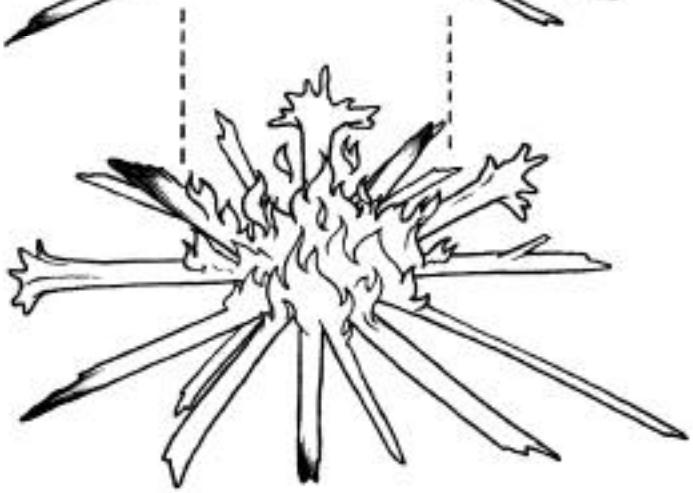

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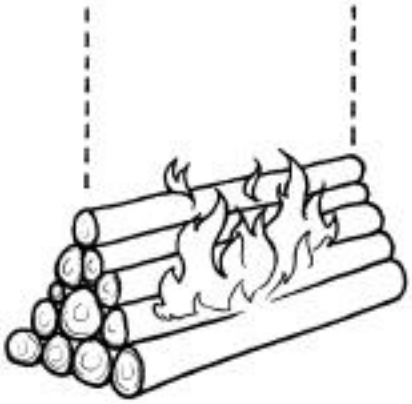

r Fire

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III. OUTDOOR CLOTHING

Risk of hypothermia is a factor in all Junior Forest Warden activities. By teaching wardens how to dress appropriately for the activity and the weather, wardens and leaders practice prevention, and accept responsibility for their own personal safety.

date completed	✓		
_____	☐	Demonstrate how to use outdoor clothing to manage thermoregulation.	page 35
_____	☐	Describe three types of clothing fabrics and the qualities of each.	page 41
_____	☐	Give a 10-minute outdoor clothing lecture at school or to a Pathfinder group.	page 44

III. Outdoor Clothing

1. Demonstrate how to use outdoor clothing to manage thermoregulation.

Background

Heat leaves the body in a variety of ways:

- Conductive Heat Loss occurs when contact is made between your body and a cooler surface. It can be minimized by not sitting on the cold ground, especially on snow or rock. Conduction occurs 25 times faster with wet clothing than with dry.
- Convective Heat Loss occurs when body heat warms the air (if submerged, the water) adjacent to the body; that air then rises and moves away from the body and fresh colder air replaces it. Wind increases the speed of heat loss through convection. The impact of heat loss from convection is measured by the windchill factor, see Windchill Chart in Appendix I. An important element in dressing for the backcountry is trapping the air around the body.
- Radiant Heat Loss is caused by the escape of infrared radiation from the body. It is minimized by wearing insulative fabrics or with fabric that reflects the heat back to the body.
- Evaporative Heat Loss occurs when perspiration (water) on the skin evaporates, drawing heat from the body. Minimizing the amount of sweating is important in reducing evaporative heat loss. In hot weather, on the other hand, evaporation is essential in cooling the body to prevent heat illnesses.

- From The Backpackers Field Manual by Rick Curtis.

Thermoregulation is balancing the heat a body loses to the environment with the heat generated from exercise. An example of proper thermoregulation is when heat production and heat retention are greater than the cold environment. If the environment is greater than heat production and heat retention then a person is susceptible to hypothermia or frostbite.

Heat can be produced in the body by exercise and by shivering. Some of the heat retention factors include:

- body size and shape (the surface-to-volume ratio affects how quickly heat is lost)

- insulation (type of clothes and layering affects heat retention)
- body fat (the amount of body fat affects how quickly heat is lost)
- core body response (The body has a natural response to protect the vital organs in the torso and head by cutting off blood flow to the extremities. That response is not a medical problem but is a symptom that the body is under stress.)

The human body has a number of ways to maintain the core temperature of 37° C (98.6° F)

- Increase of the blood to the surface which increases heat loss.
- Decrease of blood flow to the arms and legs which decreases heat loss.
- Sweating cools the body by moisture evaporation.
- Shivering generates heat by increasing activity in the muscles. Exercise is better than shivering for heating the body.
- Changes in activity levels will either increase or decrease heat production.
- Putting on or taking off clothes helps to regulate the body's temperature.

Layering

Dressing in layers instead of wearing one bulky garment, can help prevent uncomfortable and potentially dangerous situations. Layering is a simple procedure that allows a person to adjust to a wide variety of environmental conditions.

The still air around the body is like a micro-climate. This micro-climate can easily change by physical activity, wind temperature and moisture. Wearing a series of thin layers allows a person to fine tune the micro-climate by shedding layers before the body gets too hot and adding layers before it gets too cold. By combining different fabrics in several layers, a comfortable body temperature can be maintained without excessive sweating which can lead to heat loss.

Follow the sequence below to vent excessive body heat:

1. uncover ears
2. uncover neck
3. uncover one hand
4. uncover second hand
5. open clothing at neck
6. open clothing at wrists
7. remove all head gear
8. remove layers of clothing

If the removal of a clothing layer is too much, re-establish parts of the sequence, for example, cover the ears, neck, replace mittens after the outer shell is taken off.

The Seven Clothing Layers

1. Inner Layer

   This underwear layer keeps the skin dry. The best fabric to wear is a hydrophobic synthetic fabric such as polyester, or polypropylene. It will move perspiration away from the skin.

2. Middle Layer

   This layer gives some insulation and protection from the elements, and should continue to transport the moisture from the inner layer. Clothing such as a zip-front turtleneck or button shirt (made from middle weight polypropylene or lightweight wool or fleece) allow for ventilation. Extra layers may be added as the temperature gets cooler and activity level changes.

3. Outer Layer

   This is another insulation layer used when activity level is low. The best garment for the torso is a wool sweater, fleece jacket or vest. Wool absorbs up to 30 percent of its own weight in water so it gets very heavy. Fleece or wool pants may be added to protect the legs.

4. Shell Layer

   The shell protects the micro-climate from the elements. The shell is an outer jacket and pants layer that blocks the wind, rain and snow. A windbreaker shell minimizes heat loss and keeps the air trapped by the layers underneath. A waterproof shell that is not breathable also traps the moisture from perspiration. If so, the shell should have armpit and full front zippers. The best shell should be waterproof and breathable so it can provide protection from wind and water and not encourage perspiration.

5. Head Layer

   A hat will provide protection from the sun and rain and reduces heat loss. In cold weather: Up to 70 percent of the body's heat can be lost through radiation and convection from the head in cold weather. Because the head has no fat for insulation, the head acts like a radiator, letting heat escape. A hat conserves heat and allows the body to send more blood to the extremities (hands, legs, feet.) A good wool or fleece hat will slow heat loss, also in harsh conditions wear full-face balaclavas and neck gaiters. In hot weather: A wide-brimmed hat will protect the body in downpours and protect from the sun and helps to prevent overheating.

6. Hand Layers

   In cold weather the hands can be insulated with loosely fitting mitten and gloves. The best combination is a polypropylene glove liner and wool mittens. Mittens are better than gloves because they have a greater surface area for radiating heat between the fingers. A layering system with a thin layer wool or synthetic glove for moisture transport and an insulating mitten and a non-insulating shell mitten for outer protection will cover a wide range of temperature control and still offer manual dexterity. Gloves are good to have for tying knots and other tasks requiring the use of your fingers.

7. Feet Layers

   Wear two to three pairs of socks inside boots. A lightweight liner sock helps to pass moisture away from the foot. The second and third layers should be medium to lightweight wool or wool blend. Wearing more than one layer of socks allows the socks to slide against each other instead of against the skin. Cotton socks are not recommended because they will absorb and retain moisture from the feet.

The body gets cold from the following negative factors:

- temperature
- body wetness (from rain, sweat and water)
- wind

Water is the single greatest threat to personal comfort. Rain and snow are not the only water sources. The human body produces moisture in the form of perspiration. At rest, a body gives off about 57 ml of water vapour every hour. Heavy exertion causes a body to give off up to one litre in sweat over the same period.

Water conducts heat away from the body more than 30 times faster than air. A person outdoors must, therefore, manage the body's moisture effectively and get it away from the body as quickly as possible. The water vapour must get from the inside to the outside. And this can be accomplished by

venting (opening the neck area), removing some clothing layers, and wearing appropriate clothing.

Windchill is a major factor in increasing heat lost through convection. As the body heats air, it is replaced with a cooler air pushed by the wind, and over time, the heat lost will be more than the heat produced by the body.

Staying Warm at Camp

When you first get up in the morning and at the end of the day, your activity level will be low and so will the air temperature. You will need to have many, if not all your clothing layers on until you become more active, for example, after breakfast.

Good Morning

As your activity level increases you will need to shed some layers since you will begin generating heat. A good rule of thumb is to strip down until you feel cool, not chilled, just before you are ready to hike. If you begin with too many layers, you will be removing clothes after just 10 minutes. If you stop for more than a few minutes, you may need to add a layer to prevent getting chilled.

Good Night

At the end of the day, as activity decreases and temperature drops, more layers will need to be added. Once you start to cool down, it takes a lot of the body's calories to heat up again, so layer up as quickly as possible before you get chilled. Put on more than you think you need because it will get colder. If you are too warm, open up the layers and ventilate to reach a comfortable temperature.

To prevent cold injuries

- Stay Warm
  Wear several layers of loose-fitting clothing, preferably wool and keep the head and neck covered.
- Stay Dry
  Avoid getting wet, even by sweating.
- Eat Well
  Eat high energy foods at regular intervals.
- Stay Safe
  Limit the time spent in the cold. Stay with a partner so you can check each other for signs of cold injuries.
- Avoid use of Tobacco and Alcohol
  These contribute to cold injuries by decreasing blood circulation.

Activity Idea

- Go through with the Wardens What Would You Do activity sheet. Wardens have a copy in their own manuals on page 34. Answers: A-2, B-4, C-1, D-6, E-3, and F-5.

What Would You Do?

Listed below are dangerous situations that could result in cold injuries. Match each situation with a safety practice that could prevent cold injury.

Dangerous Situation	Safety Practices
A. Poor nourishment	1. Wear warm clothing and protect your head, hands and feet.
B. Weakened condition	2. Eat foods such as chocolate, nuts or raisins frequently when you are in the cold.
C. Poor clothing	3. Carry an extra pair of woolen socks so you can keep your feet dry.
D. Long exposure	4. Avoid over-tiredness.
E. Wet clothing	5. Use the "buddy system" to ensure safety in the cold.
F. No partner	6. Stay outside for only short periods of time when the temperature is very low.

2. Describe three types of clothing fabrics and the qualities of each.

Background

The most important information a Warden should know when venturing outdoors is how to dress properly. (Some would argue, however, that the second most important information is knowing how to light a fire in any weather condition should be the most important.)

- **Wool**
  Wool traps air and absorbs water. It is extremely effective as an insulator because of its fibre. Depending on the wool, as much as 80 percent of its bulk can be air. Even when wool is wet, the dead air spaces still insulate. Wool releases moisture slowly thereby minimizing the chilling

effect however, wool absorbs a lot of water and the garment can get quite heavy. It also takes a long time for wool to dry.

- **Cotton**
  Cotton is hydrophilic-it absorbs and retains. Once it is wet, it loses heat 25 times faster than dry clothing. The worst thing to wear on outdoor trips is blue jeans. When they get wet at the bottom, the pant legs are like wicks and suck all the moisture up the leg. Cotton is comfortable when its dry but looses all its insulating qualities when wet. Wet cotton can be a significant factor in hypothermia. It is also difficult to dry.

- **Polyester or polypropylene**
  These are synthetic fabrics. As outer wear, a plastic fabric like arctic fleece stays warm when it's wet and dries quickly. Fleece has the same insulation qualities as wool and has poor wind resistance. Some synthetic fabrics designed for the inner layer (underwear) are hydrophobic ("water hating") and pull the water from the body outward. These are very effective.

- **Gore-Tex™**
  Gore-Tex, introduced in 1976, is a waterproof fabric that is functionally breathable as well as windproof. The Gore-Tex membrane has nine billion microscopic pores per inch. These pores are 20,000 times smaller than a single droplet of water but 700 times larger than a molecule of water. This allows water vapour from perspiration to easily pass through the membrane while keeping water from the outside at bay. Is Gore-Tex the stuff of dreams? A windproof garment can keep a person 20 percent warmer because wind cannot displace the warm dead air trapped by insulating clothing layers.

Other fabric types include:

- **Cotton/nylon and cotton/polyester**
  Blends of cotton and nylon, and cotton and polyester, are more wind-resistant than 100 percent cotton, but still should be avoided by serious outdoors people because of there absorbent nature.

- **Wool blends**
  Blends are less warm than 100 percent wool but may be more durable and less expensive.

- **Nylon**
  Compared to cotton, nylon is lighter and more durable.

- **Uncoated nylon**
  This fabric is wind-resistant and breathable but not waterproof.
- **Ripstop nylon**
  A grid of threads strengthens garments made from ripstop nylon making them more durable.
- **Nylon Taffeta**
  Moderately water-resistant, this material is strong and often used in the manufacture of tents.
- **Cordura**
  A heavy, coarsely woven nylon material, abrasion-resistant and strong. Coatings improve water resistance, but they don't bond as well to Cordura as they do to other materials.
- **Neoprene**
  Neoprene is strong, but weighty. It is typically used in clothes made for paddle sports.
- **Urethane or Polymer**
  These are added for water resistance as a coating on nylon or polyester, but are heavy and not breathable.

Activity Ideas

- Have Wardens work in small groups and bring in samples of outdoor clothing made of wool, cotton, polyester/ polypropylene, and/or Gore-Tex. Give a short presentation to another group on the pros and cons of the fabrics.
- Have small groups of Wardens choose one fabric type. Have them make a short presentation to the rest of the group about the fabric type. Have them bring in various samples of clothing. They must use a fan (wind) or water (rain) as part of their presentation.

3. Give a 10-minute outdoor clothing lecture at school or to a Pathfinder group.

Activity Ideas

- Have a Pathfinder volunteer to be Exhibit A: The body. Have the Adventurers bring samples of clothing layers and dress Exhibit A (who is fully clothed) in the seven layers of clothing (inner, middle, outer, shell, head, hands, feet). This will be a great laugh because Exhibit A will look funny in big clothes and will get hot. Suggestion: Exhibit the clothing layers on the floor and discuss the importance of each layer before Exhibit A is dressed.
- Have Wardens bring in samples of clothing that do not provide insulation for outdoor activities. For example, cotton socks, thin cotton shirts, and so on.
- Demonstrate the wick action of blue jeans. Place a bucket of water on the floor. Put the leg bottoms of the blue jeans into the water. After the presentation, observe how far the water has soaked up the pant legs. Have another similar demonstration with a pair of sweat pants. Compare the differences/similarities between the fabric types. This demonstration will leave a lasting impression on Pathfinders.

IV. SHELTER.

In an outdoor survival situation, the ability to find or make a shelter can mean the difference between comfort and discomfort, or surviving and not surviving.

date completed	✓		
_____	☐	Construct and use a lean-to.	page 47
_____	☐	Construct and use three types of snow shelters and/or shelters from natural products combined with plastic and nylon.	page 54
_____	☐	Demonstrate two techniques for low-impact emergency shelters for use in natural areas.	page 59
_____	☐	Demonstrate the proper location of shelters.	page 61
_____	☐	Explain qualities and desirable features of tents.	page 62

IV. Planning

1. Construct and use a lean-to.

Background

The whole topic of bush shelters is extensive and complex. There are shelters that will specifically ward off rain, snow, wind, and insects, with some fulfilling one role well and others standing up to all the impositions of the environment all at once. Some shelters require a fire in front to keep occupants warm while others are kept warm by occupants themselves. Shelters may be built above the ground, on the ground, partially in the ground, or completely in the ground. The form a shelter takes may depend on the building materials, tools available and the expertise and experience of the builder.

The Principles of the Lean-to

In essence, the shelters first function is to prevent any air movement through the back and the two ends. Its second function is to intercept any rain or snow from overhead.

Good sites can generally be found near the bases of tall spruces and large overhanging boughs. The ground near the base of the spruce is often spongy, drier in the rain, or more free of snow in the winter, as the tree tends to offer considerable protection from above. Overhead protection as well as a bough bed are often unnecessary when a good spruce can be found. You may only need protection from the wind.

A familiar form of boreal forest survival shelter is the lean-to or matchegin. The lean-to is often maligned by those who have not taken the time to understand it. It is one of the many shelters available to the expert survivalist and it could be the first type of shelter to be mastered by the novice because of its ease of construction and wide range of applicability.

The lean-to has certain advantages and disadvantages. Its main advantage is that it can be built readily anywhere there are trees. It is an easy shelter to build with the most readily available materials, such as spruce boughs, and if necessary, can be built without any tools. A person trained in the use of a good Mora knife should easily be able to cut down green trees with it as thick as the wrist for the rafter poles faster than most people can cut them down with a hatchet. The ridge pole, which should be at least 10 cm in diameter, can be cut down with a knife and baton in about five minutes.

Its main disadvantage is the large fire that has to be maintained in front of it to keep you warm. Gathering adequate amounts of fuel is exhausting. The amount of fuel

needed during the night would keep a 12-person teepee with a stove warm for a week or more. Another disadvantage may be the amount of materials and time required to build a cozy, functional shelter if either resource is scarce.

The Simple Open-fronted Lean-to

In conjunction with the re-emitter fire, the simple, open-fronted lean-to is one of the more tried and favoured shelters. Both the lean-to and the re-emitter are oriented parallel to the wind. A variance of up to 15° from either angle can be tolerated before you begin to experience problems with smoke. The ridge pole of the shelter is placed about one small pace from the face of the reflector fire when it is very cold, a long pace in moderately cold weather, and two paces away when the temperature is above 0°C.

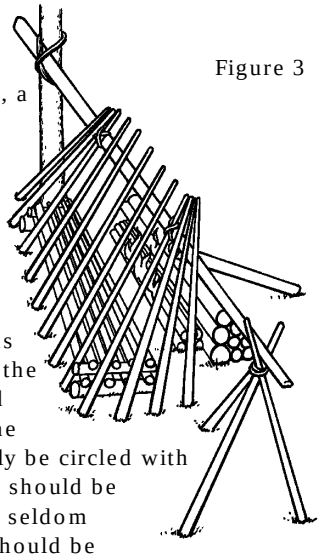


Figure 3

Securing the Ridge Pole

The ridge pole of the lean-to should be sturdy and sound so as to easily bear (without bending) the weight of the poles, boughs, and banked snow used in building the shelter. If the butt end can barely be circled with the four fingers of both hands, it should be adequate. A sound ridge pole is seldom found lying on the ground and should be made from a standing tree.

The ridge pole can be supported between two standing trees, two tripods, or a tree and a tripod. The latter is the recommended method because the tree provides stability and the tripod provides for ease in rearranging the shelter, should there be any wind shift after the shelter is built. The two standing trees have to be used when the shelter is built of poles or split logs because of the great weight that has to be supported by the ridge pole. Tripods are notoriously unstable if there is a heavy lateral force applied to the ridge they are supporting.

For ease of handling and for providing a convenient height to work and live, the ridge pole is erected shoulder high from the ground. Sound poles are selected to make the tripod. To determine the point at which the lashing should be placed, one of the poles is stood upright and grasped head high. The legs

of the tripod are spread wide enough apart so that the ridge pole placed on it comes down to shoulder height. If possible, make the ridge pole long enough so that the tripod supporting the end is excluded from the main body of the shelter; it tends to get in the way when building the bough thatch. See figure 3. The other end of the ridge pole can be lashed or propped up with a stick. In either case, the ridge pole is on the same side of the tree as the back of the shelter. If no lashing material is available in winter, serviceable cord can be twisted from the grass found near the bases of smaller spruces. In the summer, roots from almost any tree, especially spruce, can be used.

Occasionally there is a tendency to shift parallel to the ridge pole causing a collapse of the shelter. This is prevented by lashing the ridge pole firmly at the tree support end.

Installing Rafter Poles

Dry rafter poles for the back of the lean-to can be gathered without the use of the axe. The poles can be burned off to the required length. They are limbed by being run back and forth between two closely spaced trees. When using boughs, the poles are roughly spaced a hand span apart or narrower. The ends are closed to block the wind, especially on the windward side.

(Pole Lean Angles)

The poles are leaned against the ridge pole at the shallowest angle possible that still provides adequate over-hand protection. The deeper the shelter, the colder the opposite side of the body may be. The closer the shelter-back is to the fire, the greater the chance is for it to warm up, and in turn, for it to be better able to warm the shelters occupant.

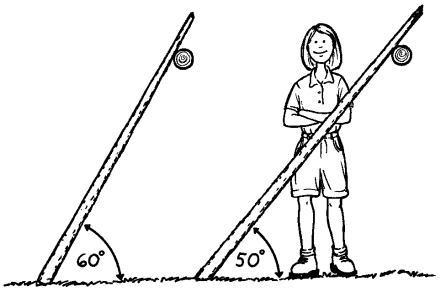


Figure 2

The effect of the radiant energy is the inverse of the square of the distance. That is, if the back is one metre away, the effect could be $\frac{1}{1}^2 = 1$, at two metres $\frac{1}{2}^2 = 1/4$ and at 3 metres $\frac{1}{3}^2 = \frac{1}{9}$.

That is, doubling the distance away from the fire gives you one-quarter the effect. Tripling the distance gives you one-ninth of the effect. If the shelter has to deflect rain, then the steepness of the rafter poles has to be increased to the point where the boughs will shed the rain. In severe rain storms,

the back of the shelter may be almost straight up and down and may have to be higher than shoulder height to provide adequate coverage. The rafter poles used in the back of the shelter should not be excessively long as they may catch the rain and drip into the interior of the shelter.

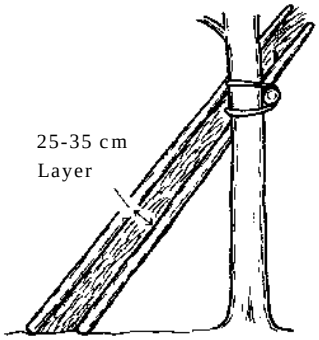
Weather proofing your shelter

Boughs are now placed on the back of the shelter. The best boughs are of balsam or alpine fir, with white spruce being second in quality. Any material including the needle-less lower branches of spruce, leafy alder tips or handfuls of densely packed swamp birch, to name a few.

A layer of about 25 to30 cm is required. In winter the layer of boughs has to support the snow banked on it and at the same time be thick enough so that the heat of the fire will not penetrate through and melt the snow. The snow is usually banked up high enough to be half metre higher than the top of the bed in the shelter. This assures a still-air space inside the shelter. It is very annoying and disruptive to your sleep to have to frequently turn over to warm up that side which is away from the fire. It bears repeating that this is one of the most essential points in making a comfortable lean-to. The boughs have to be packed as densely as possible and perhaps compressed with logs at the back of the shelter. If the boughs are to deflect all rain, depending on the severity of the storm, they have to be piled on quite thick. The first layer of boughs is composed of the biggest boughs available. They are set down, stem first, top side out. These boughs provide a foundation for the smaller boughs that are laid on next. The remaining boughs are placed stems up and under sides up, as experience has shown that this provides the maximum shedding effect. After the first layer is applied, the stems of the boughs are jammed into it to produce a neat shingled effect. The first layer of boughs can be laid on at a slight sideways angle to help keep the stems of the boughs from reaching into the shelter between the rafter poles.

The roof of the shelter can be made of a great variety of materials, especially in the summer. Two or three layers of straight poles are quite effective. Sheets of bark from dead birch and black poplar trees are good. Green white poplar splits very easily when frozen and the split halves can be very effectively used to make lean-to. In summer, any leafy branches can take the place of boughs. Clover, as found on many river banks, is quite effective. Grass thatching may also be tried.

Chinking With Moss

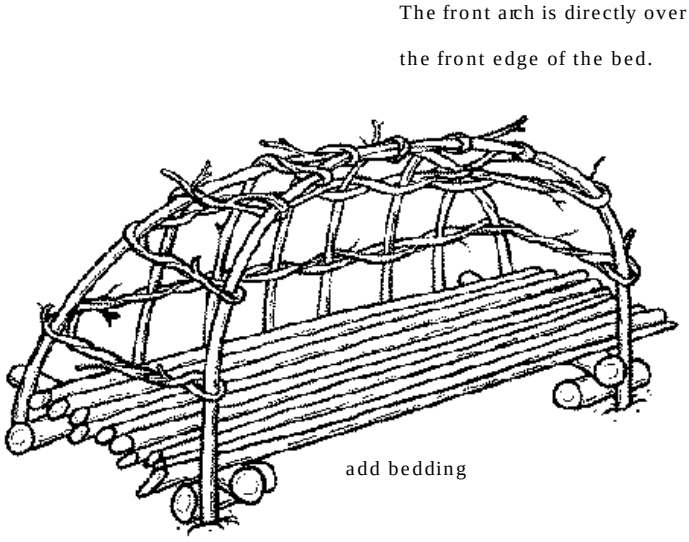


When it is very cold and there is no snow available, one of the most effective shelters is made of two layers of closely fitting poles chinked with moss.

Variations

Flexible Open Fronted Lean-to

On occasion, though poles are not readily obtainable, thinner flexible materials are. The ridge pole and its supports are replaced by two arches paralleling each other about 30 cm apart, spanning slightly longer than one's height. The two arches are brought together at the top and bound together to provide stability. Instead of rafter poles, arches a hand span apart, make up the back of the shelter. The shelter can now be roofed with any of the materials mentioned earlier, especially grass.



Flexible Open-fronted Lean-To

Options for accommodating more than one person

With one person, the lean-to is made large enough to accommodate that person. Two people increase the length of the bed about one-third longer and sleep with heads at opposite ends, overlapping heels to hips. With one-third the effort, a second person is accommodated. A third person replaces the re-emitter fire with a second one person lean-to and a fire is maintained between the shelters. Four people use two of the longer shelters with a fire in between. Five or more people may be better off using a brush teepee which in actuality is a lean-to in a circle with a smaller fire in the middle.

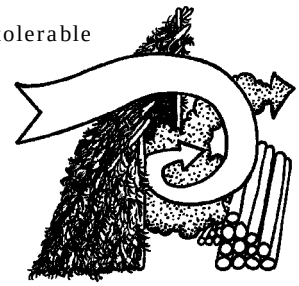
From **Northern Bushcraft** by Mors Kochanski.

Wind Direction Relative to Shelter Back

Best

Barely tolerable

Intolerable



Worst

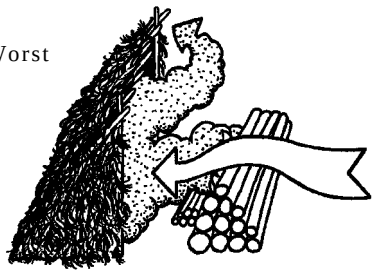


Figure 1

The Cross Section of a Winter Lean-to

1. Make the shelter under a tree that provides some overhead protection.
2. Face the shelter towards the sun.
3. The ridge pole is substantial enough to hold up the weight of the boughs and snow cover. The ridge pole is parallel to the wind. It is about shoulder high off the ground providing room to sit and work under the shelter roof.
4. Rafter poles must be leaned (see figure 1 page 48) against the ridge pole with the shallowest angle possible.
5. The back of the shelter is as close to the fire as possible.
6. Boughs are thick enough to prevent heat penetration from melting the banked up snow.
7. Snow is banked up to prevent infiltration of cold air. If possible, bank up the whole roof with snow.
8. The core of the bed is made of snow. It is about chair seat high. The snow is retained between logs which keep the snow from melting out from under the bed. With an elevated bed the ground can be uneven.
9. The snow is cleared between the fire and edge of the bed.
10. The bough bed is at least four fingers thick when compressed.
11. Wall backed fire is waist high. Fire is one good step away from the edge of the bed. Fire is made hot enough to force you to stay one step away.
12. A clear expanse of snow in front of the shelter provides more warming effect from the sun.

2. Construct and use three types of snow shelters and/or shelters from natural products combined with plastic and nylon.

Snow Shelters

1. **The Quinzhee**

The quinzhee is a simple snow shelter and the most valuable because it can be made from virtually any kind of snow, from powder to wind blown slab.

The theory behind a quinzhee is simple; snow hardens when mixed and compacted. Undisturbed snow, lying on the ground exists in various stages of metamorphosis or change. The snow is stratified into layers that are the result of factors such as the temperature-gradient within the snowpack and the conditions during which the snow originally fell. When this snowpack is disturbed by mixing and compacting, a great deal of re-crystallization occurs. The snow pile hardens.

Once the pile of disturbed snow has been allowed to harden, it can be hollowed out to make the snow shelter called the quinzhee.

Here's How

1. Use shovels, pots, pans, anything that will clear a two to three metre diameter circle to the ground if in shallow snow, or to a hard snow layer.
2. Shovel all the snow back into the circle and all available loose snow into a huge pile. Make sure all the snow gets mixed up. Break up slabs or blocks to a fine powder and avoid icy crust layers. Jump up and down on the pile to occasionally mix and compact the snow. Take care to ensure that the pile is dome shaped with no flat spots.
3. Stick branches, ski poles or glacier wands into the pile about 35 cm down at regular intervals. Leave them in the snow (they will be used as snow wall depth guides.)
4. Allow one to three hours for the snow to consolidate or harden. Take this time to rest or do another activity.
5. Cut a low entrance tunnel perpendicular to the prevailing wind and begin to excavate the inside to form a dome shaped room. Use the sticks or poles as

A burning wooden match has 1 BTU. A standard candle gives off 300 BTUs. Two burning candles will replace two people's body heat in a shelter

guides to tell you when you are getting close to the limit of the wall.

6. When the structure is almost hollowed out, use the remaining snow from the ceiling to build up the height of the floor.
7. Smooth the walls to prevent drip points.
8. Light a candle inside and allow its heat to help consolidate the walls and floor.

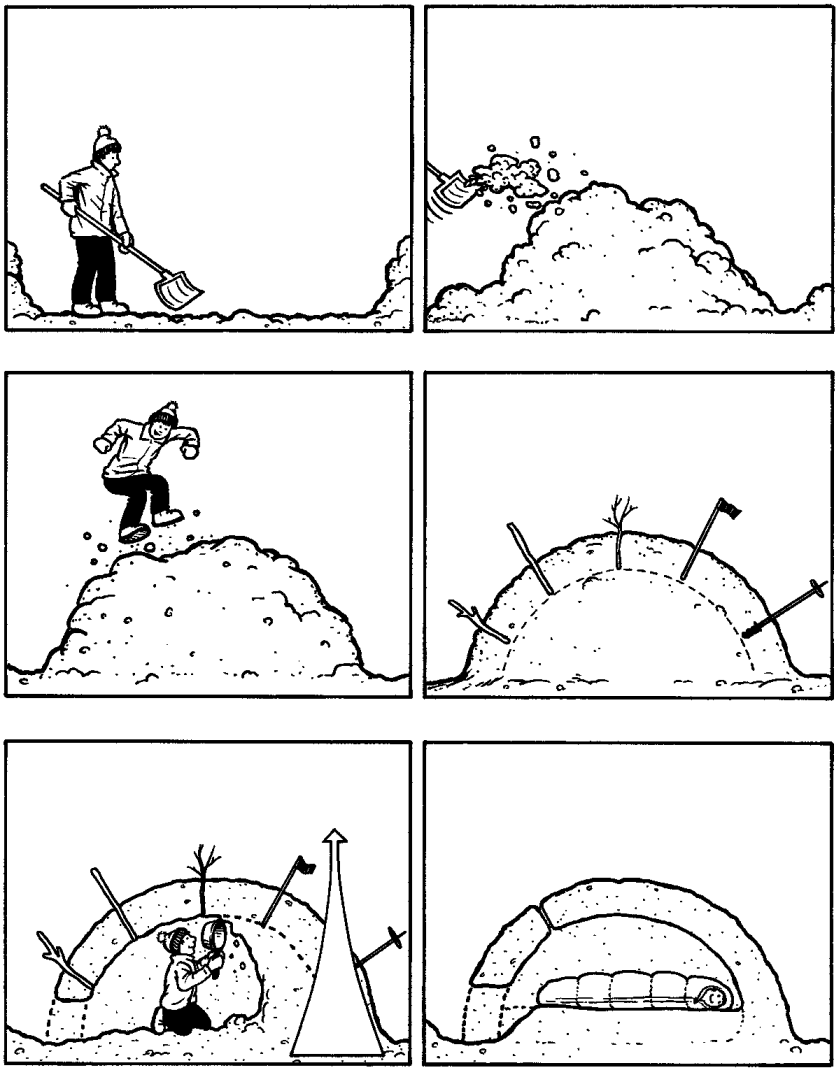
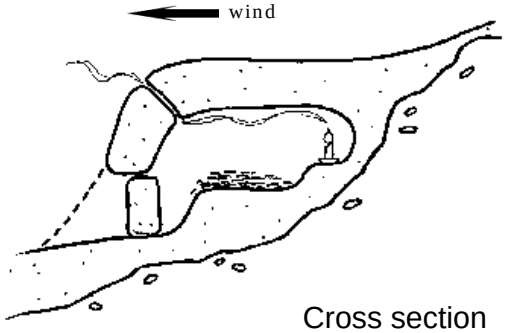


Figure 4

2. Snow Drift Cave

A snow cave requires a snowbank of fairly large dimensions. Trying to excavate a snow cave out of a drift through a small, low entrance tunnel is wet, cold and frustrating work. If you start with a large entrance which can later close back in, you will be able to work faster and remain dry.

Drifts can be found on the lee sides of wind exposed ridges, rocks and low clumps of trees and shrubs.



Cross section

Snow Knife and Saw

The essential tools for winter survival are the snow saw or snow knife. They are easy to make as they do not require any tempering which would make them brittle for fine honing.

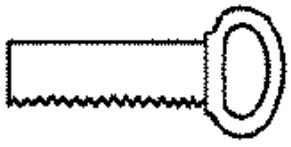
Snow Knife

A knife with a 50 cm long and 5 cm wide blade, and a two-hands handle. The thick two hands provides a good grip while wearing a pair of heavy mittens.

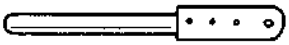
Snow Saw

The blade is 50 cm long and 9 cm wide. The handle is made for two hands and is designed so that one saws vertically.

Snow Saw

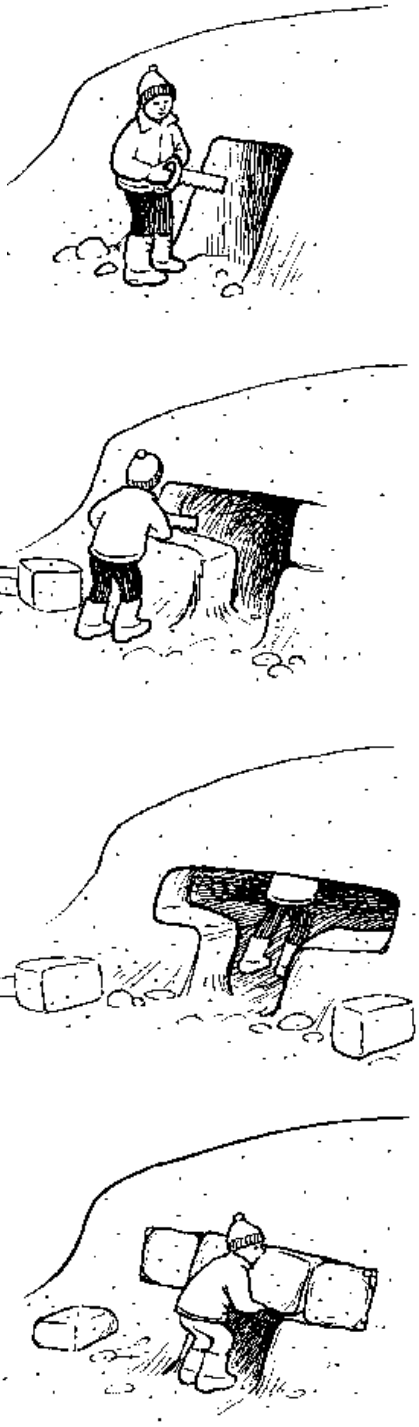


Snow Knife



Constructing a Snow Drift cave

1. Dig a 1 meter high hole into the drift. The hole can be dug with a shovel, a wooden board, hands, a snow saw or snow knife.
2. Dig a horizontal rectangle at shoulder height keeping the snow blocks that are removed.
3. Dig upwards into the drift. The objective is to make a platform for a sleeping area above the entrance opening. You may also create three levels inside: your candle on the highest, sleep on the centre one and the lower level which will trap the cold.
4. Cover the triangular opening with the snow blocks from the original digging. Fill cracks with snow.
5. Make a small ventilation hole in the roof of the shelter
6. Use a block of snow as a door and keep is loose fitting and on the INSIDE so that it will not freeze up and jam. If it does, a block on the inside will be much easier to free than one on the outside.

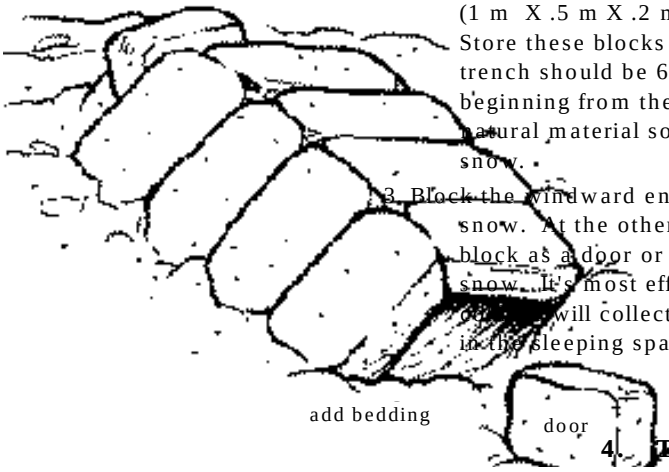


3.Trench Shelter

The trench shelter is the most efficient snow structure in terms of shelter space created with a minimum movement of snow. The trench shelter can be built into a drift or whatever when there is more than one metre of consolidated snow. This shelter is suitable for only one person and for short-term use.

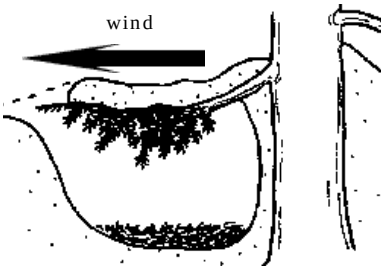
Here's How

1. To start, either dig a pit into the snow pack or flatten the lee face of a drift.
2. Using a snow saw, start excavating large blocks (1 m X .5 m X .2 m) out of a deep parallel sided trench. Store these blocks on either side of the trench. The trench should be 60 cms deep and about 2 metres long beginning from the start of the pit. Line the floor with natural material so you are not sleeping directly on the snow.
3. Block the windward end with another block or piles of snow. At the other end (downwind) have a removable block as a door or dig an entrance. Fill any gaps with snow. It's most effective if built on a slight slope, the cold air will collect in the entrance leaving warmer air in the sleeping space.



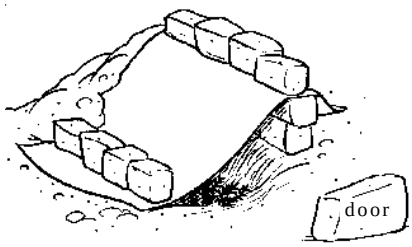
4. The Tree Well

Spaces underneath the spreading boughs of conifer can offer shelter. A medium-sized tree may have a space around the trunk. A large tree may have pockets in the snow beneath a branch. Dig under the tree where the branches are spreading on the lee side.



5. Shelter Combination

Soft snow can be built into a wind break. Anchor a ground sheet or poncho along the top with packed snow or snow blocks. Use more snow to close the sides.



3. Demonstrate two techniques for low-impact emergency shelters for use in natural areas.

Background

The type of shelter you build depends upon the local conditions, the material available and how long you expect you'll need it. Rig up a makeshift shelter to protect yourself from the elements. If no materials are available for constructing a shelter, make use of the cover that is available. Use landscape features such as cliffs and overhangs which can protect you from rain and wind. If you are in the open grasslands, sit with your back to the wind and pile any equipment behind you as a windbreak.

Bough Shelter

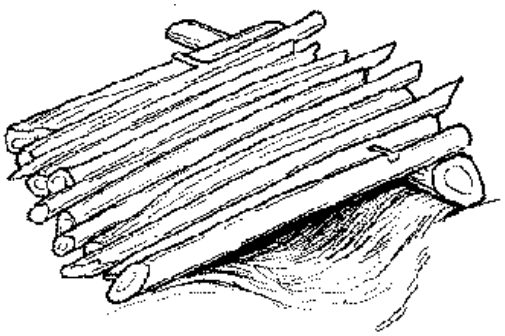
Make use of branches that sweep down to the ground or boughs that have partly broken from the tree to give basic protection from the wind. With conifers you can weave in twigs to make the cover more dense. Another similar shelter can be made by lashing a broken off bough to the base of another branch where it forks from the trunk.

Root Shelter

The spreading roots and trapped earth at the base of a fallen tree make good wind and storm barriers if the wind. he extended shelter

Natural Hollows

A shallow depression in the ground will provide some protection from wind and can reduce the effort in making a shelter. If it's wet, take measures to deflect the downhill flow of water around it. Make a roof to keep rain off and warmth in. Place some branches across the hollow. Another layer may be added and consolidated with turf, twigs or leaves.



Fallen Trees

A log or fallen tree trunk makes a useful windbreak on its own if it is at the right angle to the wind. With a small trunk, scoop out a hollow in the ground on the leeward side. A log can make an excellent support for a lean-to roof of boughs.

4. Demonstrate the proper location of shelters.

Background

A shelter is what gives you cover and comfort away from home. It will shade, repel wind and rain and keep in warmth. Sleep and rest are essential while outdoors and the time and effort you put into making a shelter comfortable, will pay off in terms of the way you feel and how you react to your surroundings.

Whenever you use a tarp, tent or natural shelter, think carefully about site placement. Consider leaving no trace. A tent on grass for more than a day will crush and make the grass turn yellow, leaving a direst sign of your presence. Stakes can also damage fragile soils. Guylines may also damage trees.

For a long term camp, find a secure site with convenient access to your major needs such as water, fuel and shelter.

Where's the Lee Side?

The lee side is the side away from the direction from which the wind blows. It's the side sheltered from the wind.

Guidelines

- Find a resilient or impacted location that is relatively flat. A hollowed out area will pool water in a storm.
- Look for shelter from the wind, on rising ground that has no risk of flooding.
- Identify the prevailing wind direction and set up your shelter so the openings do not face the oncoming wind.
- If you are on high exposed ground, go lower down to find a sheltered spot. If you are on low, wet ground, you need to go higher to find someplace dry.
- Check for signs of previous flooding. Look for high water.
- Find a spot safe from rock falls and avalanches.
- Ideally, you should be near water with a plentiful supply of firewood.
- Pitching too close to water may lead to trouble with insects. Running water can hide other noises that might alert you to danger or the a search and rescue party.
- Look overhead for bees' or hornets' nests and dead branches which could come crashing down in a high wind or storm.
- Stay away from game trails of any kind, especially one leading to a watering hole.

5. Explain qualities and desirable features of tents.

Background

Manufactured tents can provide you with shelter in a very short time for emergency situations such as hypothermia. Tents are easy to set up after a long day of hiking or canoeing when you are dog tired. Tents have many benefits and their use depends on your philosophy of camping, how much you want to live off the land and the kind of impact you leave.

The tent is one of the more essential and expensive items needed for sleeping outdoors. A lightweight tent that can be carried on your back is a great thing; however, a tent perfect for one use may not be the best for another activity.

Qualities

Three-season tents can be used in the moderate weather of spring, summer and fall while a four-season tent is designed to stand up to the worst possible conditions. They have stronger poles, additional waterproofing and a sturdier design.

The majority of tents have a breathable inner canopy and a separate waterproof fly. This two-walled construction is beneficial in two ways:

1. It moderates the temperature because of the insulating air space between the two walls; and
2. It allows ventilation of body vapour. During the night a person can lose up to a half a litre of water so ventilation is important. If the moisture is not allowed to escape, it will condense inside the tent and get the sleeper and gear wet.

Many tents are free-standing which means they come to life without being pegged down. This is an advantage because the tent can be assembled anywhere and then plopped down in the best site.

Desirable Features

Some of the things to look for in a tent will vary depending on:

- where and how it will be used,
- how many people should it hold,
- weight, and
- cost

Some of a tents features include:

- **tent body**

  The tent floor should be tough and waterproof and extend up to 15 cm on the tent walls. The tent body should be made of non-waterproof fabric (taffeta or ripstop nylon.) Seam construction can be in two types: bound or lap felled. Good quality tents have lap felled seams where the two pieces of fabric are placed on top of each other, folded and stitched. Bound seams are weaker and are made by stitching through a layer of material that is folded over the two pieces being joined.

- **poles**

  Most tent poles have shock cord running down the centre and attached at both ends. This makes the poles easier to assemble and keep together. Three materials used to make tent poles are: fibreglass, carbon fibre/composite and aluminum. Aluminum is the most common and comes in a variety of qualities made from different alloys: strongest is 7000 series, followed by 6000 and 2000 series. Carbon fibre/composite is expensive, light and strong. Fibreglass is cheap, heavy and prone to breaking.

- **fly**

  The fly is the part of the tent most exposed to the elements. The fly must be made of waterproof material.

- **vestibule**

  This is a separate extension added to the tent like a porch. Vestibules are useful for storing gear and taking off dirty boots outside of the sleeping area.

- **stakes/pegs**

  Aluminum stakes are light and about 23 cm (9 inches) long. Carry separately in a stuff sack to protect the tent from punctures.

- **zippers**

  This is usually the first thing to go on a tent. Look for a nylon coil zipper, its light and less likely to stick than a metal zipper.

- **windows**

  Windows should have zip closed flaps and bug netting to let the air circulate.

Buying a tent

Before you buy a tent, set it up. Take it down and re-assemble if it is already up on the store's floor. This is the best way to judge how easy or difficult it is to pitch. Could you do it in the dark? Could you do it in the park? Could you do it here or there? Could you do it anywhere?

Also look for any tight or difficult zippers that could break later. Lay down inside. Imagine how many people can be comfortable sleeping. Short ones, tall ones, skinny ones, and big ones.

Look at the outside of the tent to determine how strong it is. Push on the walls from different angles and directions to make sure it won't collapse or bend too easily. The canopy and fly should be taut, otherwise breathability, water repellency and stability are compromised.

Bad Places to Camp

- Hilltops exposed to wind (move down and look for shelter on the lee side.)
- Valley bottoms and deep hollows can get damp and frost during the night.
- Hillside terrace where the ground holds moisture.

LEADER MANUAL

V. NAVIGATION

The ability to use a compass and read a map accurately is an important skill in travelling in the woods.

date completed	✓		
_____	☐	Identify the features on topographical maps and plot a course.	page 67
_____	☐	Demonstrate orienting a map to the terrain.	page 72
_____	☐	Demonstrate orienting a map with a compass	page 73
_____	☐	Demonstrate techniques for setting a bearing and proper pacing.	page 74
_____	☐	Demonstrate the use of a map and a compass on a trip in order to prove proficiency in staying found.	page 78

V. Navigation

1. Identify the features on topographical maps and plot a course.

Background

A map is a two-dimensional representation of our three-dimensional world. All maps have in common the same basic features in common. The most useful map for backpacking, canoeing and other wilderness trips is a topographical map.

Maps have scale marked either in the margin or legend of the map. A scale of 1:250,000 means that one unit on the map is equal to 250,000 units in the real world.

Map Scale	1 cm Equals
1:5,000	50 m
1:10,000	100 m
1:12,500	125 m
1:20,000	200 m
1:25,000	250 m
1:250,000	2,500 m

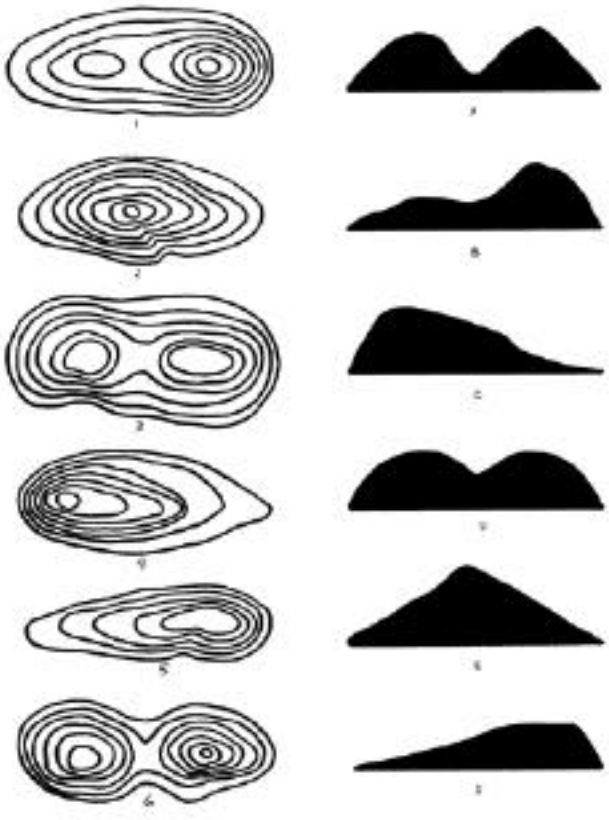
Map Colours	What They Mean
Black	Features such as roads and buildings
Blue	Water, lakes rivers, streams
Brown	Contour lines
Green	Vegetation (forest, scrub)
White	Little or no vegetation; also for glaciers and permanent snowfields
Red	Major highways, boundaries of public land areas
Purple	Features added to the map since the original survey (based on aerial photo and have not been checked)

Map Legend

The map legend contains a great deal of important information. Some of the major features are found on topographical maps listed on the next page.

- map name
- year of production and revision
- general location
- next adjacent map
- map scale
- distance scale
- contour interval
- magnetic declination
- altitude and longitude
- symbols and what they represent

Contour Lines



Sample - Contour Map

Contour lines represent the three-dimensional character of the terrain on a two-dimensional surface. Contour lines drawn on a map represent equal points of height above sea level.

Contour lines can tell you a lot about the terrain.

- Moderate slopes - contours are evenly spaced
- Steep slopes - contours are closely spaced
- Gentle slopes - contours are widely spaced
- Valleys - contours form a V shape pointing up the hill; these Vs are always an indication of a drainage path that can also be a stream or river.
- Ridges - contours form a V shape pointing down a hill
- Summits - contours form a circle
- Depressions - contours are circular with line radiating to the centre

Measuring Distance

There are a couple of ways to accurately measure distance on a map.

1. Use a piece of string to trace the route planned. Measure the string on the scale line in the legend.
2. Mark a stick to a narrow distance on the map scale, for example .5 km. Walk off the route with the marked stick. Add 5 to 10 percent to account for a route with switchbacks which might not be on the map. It is better to anticipate a longer route than a shorter route.

Choosing a Route

- Where is the destination?
- What is your starting point? What type of road access is there to the trailhead?
- Be sensitive about travelling on private land. Ask permission if possible, and keep in mind that hiking through is usually permitted but overnight camping is not.
- Do not camp in a restricted area. The area is restricted for a reason.
- Consider the abilities of group members.
- Is everyone travelling to the trailhead together? Or meeting there separately?
- Is there a loop route to bring you back to your original starting point? Is it a one-way route?
- Do you need to be picked up?

Estimate Travel Time

Travel times will vary depending on the gear being carried, trail difficulty, and different ages and physical abilities of group members. On the average, a person hikes 3.2 km an hour. Add one hour for every 305 metres of ascent.

Plan the Day

Planning a route also includes how much time is required for getting organized. For example, ability of group members, time to break camp, special sites to be visited, time for rest breaks and meals, obstacles to cross such as river crossings or bushwhacking, and number of daylight hours.

At the end of a day you have to make sure you have a place to set up camp so trip planning is done from one campsite to another. Topographical maps do not always have the information you need to choose a good campsite. For example, the contours in one area was flat which would be a good place to camp except in reality it is thick with underbrush with no open spaces.

Activity Ideas

- Have Wardens draw the contours for the hills on page 68. Refer to Match the Contours answers below.
- After Wardens have had some idea of what contours look like, make a copy of Match the Contours, page ____ and have Wardens complete. Answers: 1-B, 2-E, 3-D, 4-C, 5-F and 6-A.
- Help Wardens become familiar with map symbols. Make a copy of page ____, Map Symbol Quiz for each Warden. It's a simple fill in the blanks exercise. Answers: 1-road (improved dirt), 2-contour lines for a hill, 3-cemetery, 4-single railroad track, 5-spring, 6-well, 7-buildings, 8-bench mark (monumented), 9-marsh, 10-trail, 11-bridge (river, road), 12-triangulation station, 13-river and streams, 14-road (unimproved dirt), 15-sand dunes, 16-church, and 17 school.

Variations to Map Symbol Quiz.

1. Have Wardens looking at all the symbols used on topographical maps. Break the Wardens up into two groups. Give each group half the symbols on a map. Give each group a pile of index cards. On one side of each card they are to draw the symbol, on the reverse the text for the symbol. Use a flash cards to learn all the symbols.
2. Have Wardens invent a game similar to the card game Concentration to help them learn the map symbols. Have two cards for each symbol: one with text identifying the symbol and the other with a picture of the symbol. Randomly, place them all face down and take turns turning the cards over until two cards match, for example, the word Railroad to picture of a railroad. Take another turn when a pair is matched. The team or player with the most pairs wins.

- Play Map World - Real World. Copy the pages entitled with the same names and have Wardens match how it

would look on the map and how it really looks in person. Answers: 1-D, 2-H, 3-E, 4-I, 5-B, 6-A, 7-F, 8-C and 9-G.

- Have Wardens plot a course and determine how long it will take to hike or canoe.
- Have Wardens plan an overnight trip with a topographical map. Choose the campsite for the night. Determine the travelling time.
- Have each Warden choose 10 items from the legend and quiz another Warden on what they mean.

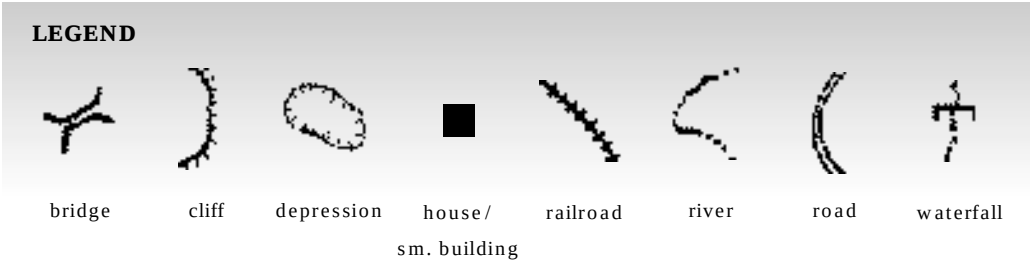
Draw contours for the hills below.

Map World

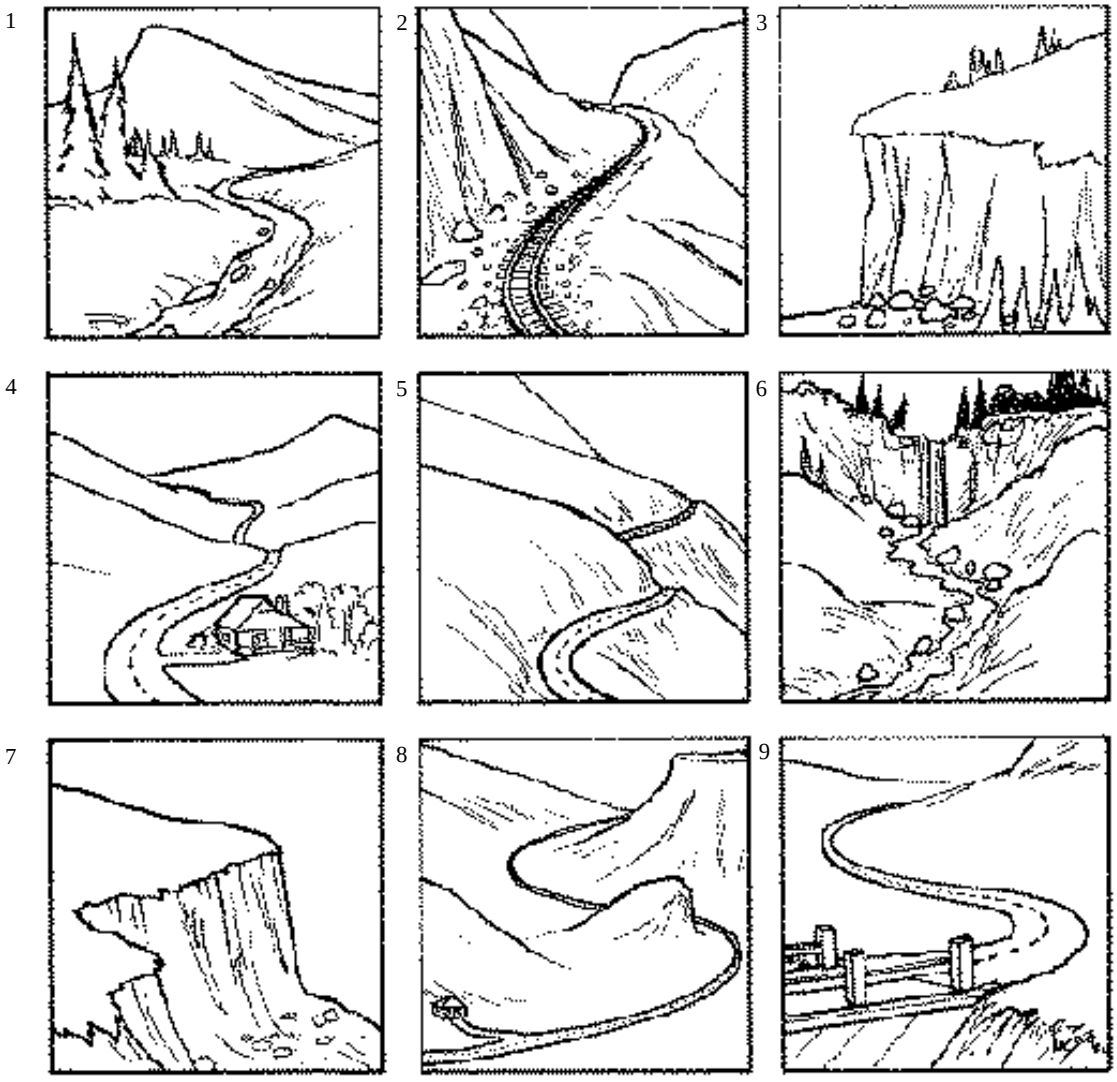
A. B. C.

D. E. F.

G. H. I.



Real World



2. Demonstrate orienting a map to the terrain.

Background

Orienting a map to the landscape is easier than reading a road map which is often read upside down. When a map is oriented to the landscape, however, the map and the features line up.

Use Land Features

Lay the map on the ground and hold it horizontally. Find two prominent features in the landscape. Rotate the map until features on the ground are in line with the same features on the map. This is an effective method for scouting but not for real navigation.

Activity Ideas

- Have Wardens orient city or town map, a area or road map and a provincial map.
- Have Wardens use a trail map of a local area and orient the map to the surroundings.
- Have Wardens orient a topographic map to the landscape.

3. Demonstrate orienting a map with a compass.

Background

Orienting a Map with a Compass

1. Place the compass on the map so that the edge of the base plate lies parallel to the east or west edge of the map, with the direction of travel arrow pointing to the north edge of the map.
2. Hold the compass on the map and "box the needle." That means rotate the map with the compass together until the north end of the magnetic needle points to N on the compass housing. The map is oriented to magnetic north. This means the compass needle direction north is the same as true north on the map. Another option is to place the compass on the map so that the edge of the base plate lies along the magnetic north indicator line on the map legend at the bottom and then rotate the map.
3. Do a visual check by looking around for surrounding landmarks which should match what is on the map. For example, if you look east, the hills match with the map, look northwest to see the valley, and so on.

Compensating for Declination

Compensate for declination if you plan to travel using the map and compass.

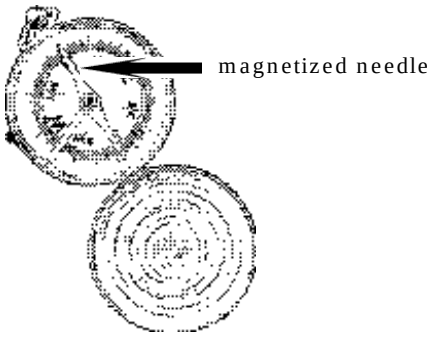
1. Determine the declination on the map. If the declination is east of true north, add the declination to 0 degrees, if the declination is west of true north, subtract the declination from 360 degrees.
2. Compensate for the declination by setting the compass at the correct declination bearing.

4. Demonstrate techniques for setting a bearing and proper pacing.

Compass

A compass is a magnetized needle that aligns itself with the earth's magnetic field which runs north to south. A compass is a navigation instrument with two important uses:

1. To maintain a constant direction of travel
2. To pinpoint a location on a map.



Magnetic Compass

Basic Rules for Using a Compass

To maximize accuracy with a compass, remember these rules:

- Directly face the object to which you are measuring the bearing.
- Keep the compass level which is level to the ground. If the compass is tilted the needle will not swing freely.
- Hold the compass directly in front, not at an angle.
- Align the magnetic needle and orienting arrow by holding the compass close enough that you are able to look down (not sideways) on the face of the compass. The needle should lie exactly straight over the orienting arrow with their points lined up.

Setting a Bearing

Become familiar with the basic uses of a compass by turning the moveable housing until the N lines up with the index line which may be labeled "Read bearing here." A bearing of north is the same as 0 degrees or 360 degrees. Turn your body and compass as one unit until the north seeking end of the needle lines up over the pointed end of the orienteering arrow. That's a bearing toward magnetic north. Follow the bearing by moving in the direction of the direction-of-travel arrow.

Have Wardens choose another bearing (a direction towards something) of 140 degrees. Turn the housing until 140 lines up with the index line. Have Wardens turn their body and compass as one unit until the north-seeking end of the needle lines up over the pointed end of the orienting arrow. The direction-of-travel arrow shows you which way to go for the 140° bearing.

Holding a compass

Setting a Compass Bearing

A basic skill in compass skills is to measure a bearing (direction) to a landmark you are looking at.

1. Face the landmark. Point the compass's direction-of-travel arrow at the landmark.
2. Bring the compass closer so you are able to get a closer reading making sure the travel arrow still points at the landmark.
3. Turn the housing until the pointed end of the orienting arrow lies under the north-seeking end of the needle.
4. Read the bearing at the index line. This provides the exact direction (expressed in degrees) of the landmark

Tip

Call the direction-of-travel arrow the nose arrow. This will help wardens remember their the nose and the direction-of-travel arrow on the compass point in the same direction.

Test Your Wardens' Skills

- Have each Warden drop a tin disc (from the top of a tin can or frozen juice container) in the grass. Tell them to choose any bearing and walk along it for 100 paces. Tell them to note the back bearing. Return on a reciprocal course. They have to watch their compass to return to their disc. How close did they get to their start after 100 paces?
- Have them walk a 60° bearing and walk 100 paces. Add 120° (60° + 120° = 180°) and walk another 100 paces. Add another 120° (180° + 120° = 300°) and walk another 100 paces. Did they end up where they started?
- Have each Adventurer design a course in the shape of a square for another Warden. The number of paces may vary and their initial bearing. (Tip: They have to add 90° at each corner.)

Pacing

Successful navigation includes the precise method of methodical pacing. Travelling on foot can sometimes feel like 10 km, when in reality it is only 4 km. It is worth the effort to count paces to know precisely where you are and be comfortable with the certainty of the distance travelled.

An adult with average height will pace about one kilometre in 625 paces (one mile in 1,000 paces.) An average adult has a step of 76 cm (30") but a pace of 1.6m.

Measure Your Pace

A pace is the measurement of a double step. Every time your foot (left or right) touches the ground, count a pace. Everyone's pace is slightly different because of leg length. Work in partners and lay out a measured course. Have one put their heels at zero and begin to walk. To calculate the length of a pace, count the number of paces and divide into the distance walked. Do two or three times and take an average of three measurements and that will be that individual's pace measurement. The average adult pace is 1.6 metres.

To keep track of the number of paces, count every time the right foot hits the ground. Count to 100 paces. To add the counted paces, transfer pebbles from one pocket to the other pocket at each 100 paces.

Walk a pre-measured distance while maintaining a normal pace and counting footsteps. Divide the distance in metres by the number of paces. If you have stopped growing that is your pace for life.

The average pace may change because of slopes (longer going down a slope, shorter going up a slope), wind (a tail wind will lengthen pace), terrain (a rough terrain surface will shorten pace), weather (snow, rain and ice will shorten pace), clothing (excessive clothing and boots will shorten pace), and visibility (reduced visibility will shorten pace due to uncertainty).

fast walking	road	6.0	10
comfortable walk	cutline	4.0	15
comfortable walk	broken, wooden	3.5	18
comfortable walk	mountain forest	3.5	25
snowshoeing	average snow	3.5	18
skiing	average snow	6.0	10
jogging	road	8-10	6
jogging/walking 50 paces	road	7.0	8

5. Demonstrate the use of a map and a compass on a trip in order to prove proficiency in staying found.

Map and Compass Together

A map and compass can only work together if you know where you are in relation to magnetic north. If you think of a map as an artist's rendition of the world, you can understand that it displays true north but not the magnetic fields like the real world.

Declination

Declination is the angular difference between magnetic north which a compass points to and true north which is the geographic north that is on maps. It is marked in degrees on the map. When a compass is used this difference (which varies depending on where you are on the planet and the year) must be accounted for. The magnetic field lines of the earth are constantly changing, moving slowly westward 1/2 to 1 degree every five years. Because of this, it is important to use the most recent map.

Some compasses can be used to preset the declination which may reduce calculation errors.

Remember this rule: To compensate for declination, the map bearing and the magnetic bearing must be equal. If they are not equal, corrections are made to bearing by adding or subtracting the declination. There are four ways to do this:

West Declination

If the declination is west, then magnetic north is less than true north and the map bearing is less than the magnetic bearing. To make the two bearings equal, add or subtract the declination.

1. West Declination - Going from map bearing to magnetic bearing

   A map bearing is taking a bearing from one point on the map to another point on the map in respect to true north. To get the magnetic bearing, add the declination to map bearing.

Map Bearing + Declination = Magnetic Bearing

2. West Declination - Going from magnetic bearing to map bearing.

   A magnetic bearing is when a bearing is taken from the landscape. To determine the position on the map, subtract the declination from the magnetic compass bearing to get the proper map bearing.

   Magnetic Bearing - Declination = Map Bearing

East Declination

If the declination is east, then magnetic north is greater than true north and the map bearing is greater than the magnetic bearing. To make the two bearings equal, add or subtract the declination.

3. East Declination - Going from map bearing to magnetic bearing

   A map bearing is taking a bearing from one point on the map to another point on the map in respect to true north. To get the magnetic bearing, subtract the declination from the map bearing.

   Map Bearing - Declination = Magnetic Bearing

4. East Declination - Going from magnetic bearing to map bearing

   A magnetic bearing is when a bearing is taken from the landscape. To determine the position on the map, add the declination to the magnetic compass bearing to get the proper map bearing.

   Magnetic Bearing + Declination = Map Bearing

How to Remember

There is a lot to remember and to make matters worse, the rules all sound the same. It's easy though if you if you remember the two rules for declination.

WEST declination: Add map to compass, subtract from compass to map.

EAST declination: Add from compass to map, subtract from map to compass.

Shortcut:

Declination East, compass least.

Declination West, compass best.

Shorter still is, East is least, West is best.

This means that when there is an east declination, the map reading is greater (best) by declination and the compass reading smaller (least)-by the amount of declination. With a west declination, the compass reading is best and the map least by the amount of declination. In each case you add or subtract the declination.

Here's a jump start for the memory. Think of Empty sea, add water. Empty sea becomes MTC (Map To Compass), add Water becomes add W (West) MTC.

The world is full of 45 degree bearings, but only one of them will connect you and your goal.

When converting a bearing from a map to compass, add west declination. Remember, declination west, compass best. From this you can figure out that you have to subtract east declination. Declination east, compass least. Or from compass (C) to (T) map (M) you subtract west and add east.

If this is all too much, write down the declination for your area and glue it to the back of your compass!

Activity Ideas

- Break Wardens up into small travelling groups. Give each a topographical map of the area with the camp site marked. Have the groups determine the best route, best route to travel and explain why, calculate the distance, how long it should take (add 5 to 10% more time), and the bearing.

VI. OUTDOOR SAFETY

It is critical for outdoor safety to learn the potential hazards, how to prevent them and how to treat them.

date completed	✓		
_____	☐	Demonstrate how to cope with two of the following in a camping and survival situation: sunburn, frostbite, hypothermia, dehydration, and wildlife problems.	page 83
_____	☐	Describe emergency techniques to acquire water during a simulated survival situation.	page 85
_____	☐	Describe six natural indicators of a storm and demonstrate the actions that should be taken.	page 91

VI. Outdoor Safety

1. Demonstrate how to cope with two of the following in a camping and survival situation: sunburn, frostbite, hypothermia, dehydration, and wildlife problems.

Sunburn

For minor sunburn, place the person in the shade and apply cool water or cloths soaked in cool water. A commercial ointment or cream may be applied for some relief. (A severe sunburn may result in swelling and blisters and must be treated as a severe burn. Treatment: immerse burned area in cold water at once. Do not break blisters.)

Frostbite

Frostbite is the freezing of deeper body tissues from exposure to cold. Frostbite may be associated with hypothermia. Signs and symptoms are: a white, waxy appearance which may be pliable in superficial frostbite or hard and solid to the touch in deep frostbite; joints stiffen and there is a loss of sensation. (Note: Frost-nip is superficial freezing of a small area such as nose, cheek or toes. Treatment is steady pressure with a warm hand on the area.)

Treatment of frostbite: Take the person into a shelter. Do NOT apply snow or rub the frozen part. Thawing is painful and should be done under medical supervision. If you must thaw, use a container of warm water (42°C, comfortable when tested by elbow) and immerse the frozen part. Warm until the area is flushed red with blood.

Hypothermia

Hypothermia results when the body loses heat. Some symptoms are shivering, slurred speech, stumbling and drowsiness. It can occur at relatively warm temperatures because both water and wind can deprive the body of heat. To prevent hypothermia keep warm, dry, rested, well-fed and hydrated.

To treat hypothermia the person must be warmed up as soon as possible. Move the casualty to a shelter. Remove wet clothes and wrap in warm covers and a sleeping bag. Give a warm, sweet drink to help warm up.

If the person is unconscious or semi-conscious they must be treated with the utmost of care. Cooled blood in the arms and legs must be prevented from suddenly returning to the body core and thus causing afterdrop. Afterdrop is the sudden further cooling of the heart caused by accelerated circulation in persons severely affected by hypothermia.

To avoid afterdrop:

- The victim should not be handled roughly. Great care must be taken in handling and transporting the victim. Be very gentle when doing this.
- Do not force the victim to stand up or walk around. In this situation even mild exercise can kill the victim.
- Do not rub the arms or legs to try and warm them. This also speeds circulation.
- Do not elevate legs or arms as you would when treating a victim for shock.
- Do not apply heat to the extremities. Apply heat to the critical areas (groin, neck and head, chest, sides of trunk.) Direct mouth-to-mouth resuscitation may help to provide warmth to the lungs and core.

Most hypothermia fatalities occur during the re-warming process.

Dehydration

Dehydration occurs when the body's water level drops. To stay hydrated you will need to drink as the very minimum three to four litres a day when exerting yourself in the elements. Add an extra litre in the winter. It's easier to prevent than to treat. Dehydration can cause heat stroke, hypothermia, frostbite, mountain sickness and death. Wardens should keep track of their urine output. They should urinate at least three times a day and the liquid should be clear, light-coloured-clear and abundant. Dark yellow to orange is a sign of dehydration.

Note:

Thirst is a late response to fluid depletion, urine is the best indicator of dehydration.

Treatment: For severe dehydration, add 1/2 teaspoon of salt and 1/2 teaspoon of baking soda per litre of water which replaces fluid and salt.

Wildlife Problems

The number of people hurt by animals is relatively small compared to those injured by getting lost, cold or dehydrated. The best way to avoid large toothed animals is to let them know you are around. Wear a bear bell, talk loudly, or sing songs. Stay away from major game trails and watering holes. Hang your food and fragrant items such as soap and toothpaste in a tree. Cook away from the area where you are sleeping.

Leeches and Ticks

Once a leech or tick has taken hold, any attempt to dislodge them will force them to do more harm than good. Apply either a lighted match, burning cigarette, common table salt, a drop of kerosene or turpentine to its body. The leech or tick will release its hold and drop off. Ticks embedded in the skin should not be pulled off since the head may remain in the skin and become infected.

In both cases, cleanse the area with rubbing alcohol. Relieve irritation with a weak solution of water and baking soda or ammonia. Apply a clean, dry dressing.

2. Describe emergency techniques to acquire water during a simulated survival situation.

Background

Water is the key ingredient to survival. The body has 75 percent water by weight. The water lost by sweat, evaporation or by body functions has to be replaced. Sweating can be controlled by wearing layers of clothing. A 2.5 L (2.5% of body weight) loss of body fluid reduces the body's efficiency by 25 percent. A fluid loss of 25 percent of body weight is usually fatal.

Ways to Retain Fluids

To keep fluid loss to a minimum, take the following precautions:

- Avoid exertion. Just rest.
- Don't smoke.
- Keep cool. Stay in the shade. If there is none, erect a cover for shade.
- Do not lie on hot ground or heated surfaces.
- Don't eat, or eat as little as possible. If there is no water available, the fluid will be taken from vital organs to digest food, thereby increasing dehydration. Fat is the most difficult to digest and takes a lot of water to break down.
- Never drink alcohol. This also takes fluid from the vital organs to break it down.
- Don't talk. Breathe through the nose, not through the mouth.

Dehydration can cause heat stroke, hypothermia, frostbite, mountain sickness and death. In the summer, a person needs at least three to four litres a day. In cold weather, metabolism speeds up to generate more heat, so an extra litre must be added. Wardens should keep track of their urine output. They should urinate at least three times a day and the liquid should be clear, light-coloured. Dark yellow to orange coloured urine means that the body is low on water and is trying to conserve its supply by hoarding fluid which makes the urine become more concentrated and darker.

Symptoms of dehydration appear within 24 to 72 hours.

Water Quality

The quality of the water is your second priority (second to finding water). Gastrointestinal infection from contaminated water is common and you can suffer from diarrhea and vomiting. Assume all water is contaminated until you can boil or purify it.

Giardia is a common water-borne parasite that exists in two forms: as a dormant cyst and the disease-causing form called a trophozite. It is transmitted from the feces of humans and animals. It causes diarrhea (explosive and watery), excess gas (smells like sulfur), abdominal cramping, weight loss, and loss of appetite. It is commonly called Beaver Fever. Boiling, chemical treatment and commercial water-filtration systems when used properly, eradicate the parasite.

A protozoa that also causes unwelcome symptoms is cryptosporidium. It's symptoms are profound fatigue, loss of appetite and intermittent diarrhea. It is highly resistant to iodine and chlorine but is large enough to be filtered out by a standard water filter.

Finding Water

Observation, awareness and common sense are the keys to finding water in the wilderness. Water flows downhill so find where the water collects. Survey the landscape and look for depressions, ravines or troughs that help water on its way to a final collection site. The surroundings may also give you clues to the location of a water source if you are observant.

- Dew and water condense on cold surfaces. You can lick surfaces like leaves and rocks. Dew usually evaporates by noon.
- Dry meandering stream beds may have water deposits just below the surface at outside bends. Dig in the bends for water.
- Dig a shallow well when you see damp sand or find plant growth.
- Small pools may be found in gullies behind large rocks or under cliffs. The water remains because the water collects on nonporous bedrock or a clay soil protected from the sun.
- Damp spots on the ground may mean a high water table.
- Look for soaks. These are places where plants and trees that need a lot of water live, for example, cattails, bulrushes and reeds, willows, poplars and cottonwood. Their growth means there is a high water table. Dig down 30 to 60 cm and after a while water will accumulate in the hole. Allow dirt to settle and filter.
- Look for natural depressions in rocks, hollow tree stumps.

Retrieving Water

- Water from Snow

  Snow can provide water. It can be discouraging since very little water is obtained from melting snow, for example, 25 cm of snow equals 2.5 cm of water. Ice, on the other hand has a 1:1 yield of ice to water. If you melt snow, constantly poke the snow with a stick or a hole will burn in the pot.

- Water from Soil

  In a muddy or damp area, dig a hole .3 to .6 m deep. Allow water to seep into the hole. Wet sand can be put in a piece of cloth which is then pressed or wrung to force the water out. The water will be cloudy and should be filtered through a fine cloth.

- Water from Plants

  Condensation - Dig a shallow hole next to a plant that has a lot of leaves. Place a plastic bag over the plant and put the sides of the bag to the lowest point in the hole. Tie or tighten the opening of the bag around the base of the plant. Water will given off by the plant will condense on the inside of the bag and will slowly flow towards the lowest part of the hole. The plant will continue collecting water with its root system. This will work for a few days as long as the plant is not too exposed or killed by overheating in the bag.

  Thistle - The most common species of North America thistle, the bull thistle, can provide water. Peel the thorns off young stems and leaves and chew the watery plant. It is good for quenching a burning hot thirst since their supply of water is meager. It will hold you over until a water supply is found.

  Dew - Collecting dew is the simplest and safest way to collect water. Use a cloth to wipe up the moisture and wring the water into a container or right into your mouth. Dew doesn't stay around very long so you have to get up early and work hard.

- Solar Still

  This is a method to extract water from the soil. Dig a hole in humid ground and set up the still. First place a cup or pail in the centre of the hole to catch water. Cover the hole with a large piece of plastic sheeting. Use dirt to weigh down the edge of the plastic sheet around the hole. Place a rock in the centre of the plastic sheet to form a concave shape. The air under the plastic heats up from the sun's warmth. The warm air becomes saturated from the humidity in the soil. The saturated air touches the cool plastic and the water condenses as droplets on the plastic. The droplets collect and flow down the plastic to fall into the cup.

Collecting Water

1. Use a balloon or a heavy extra large “zip lock” type baggie

   When using a balloon or baggie, put it in a sock and use it to transport water. The sock acts as a retainer when the balloon or baggie is enlarged with water. A balloon or a baggie can hold several litres of water. Tip: Keep a balloon or a heavy extra large “zip lock” type baggie in a survival kit for transporting water.

2. Make Something

   Use birch bark to make a vessel to carry water.

Purifying Water

Most outdoor water sources contain microorganisms that can make you sick. Ingesting just one microorganism may cause illness. Wilderness medicine experts always advise treating water to protect against waterborne microorganisms.

Beware of these three types of microorganisms:

Viruses

Most wilderness medicine professionals now recommend treating water for viruses as well as bacteria and protozoa. Viruses must be eliminated through a purification system or boiling because they are small enough to pass through a filter, for example, Hepatitis A, Polio, Norwalk Virus.

Bacteria

Bacteria are becoming a significant threat in untreated water. Microfilters remove most bacteria but smaller bacteria like Cholera, Campylobacter, E. Coli and Salmonella require a very small micron size microfilter or a purifier.

Protozoa

Protozoa are the most common microorganisms in untreated water. Their relatively large size makes them easy to filter. but their protective shell resists iodine and chlorine treatment, for example, Giardia and Cryptosporidium.

- **Distillation**

  Water that you suspect is not of drinking quality can be boiled. The vapour goes into a second vessel where it condenses back into pure water.

- **Filtering**

  1. Commercial water filters

     Most water filters are light weight and easy to use when removing debris and microorganisms from water. Good filters have screens rated to at least 0.2 microns which removes bacteria and pathogens. A filter designed to screen only large microorganisms such as giardia, need only screen to 1.0 microns. Viruses are smaller than the smallest filter so the water must be treated with iodine.

  2. Hand made filter

     Wet sand or muddy water can be strained through layers of cloth and a layer of charcoal to filter any bad taste and odour. It is collected in a basin below the filtering system.

- **Boiling**

  Water should be boiled at a rolling boil for at least 2 minutes, preferably 10 minutes. For every 305 metres (1,000 feet) above sea level add one minute. At 1,524 metres (5,000 feet) the water should be boiled two minutes for the basic treatment plus five minutes for altitude compensation. The total boiling time is a minimum of seven to a maximum of 15 minutes.

- **Chemical Purification**

  The effectiveness of all chemical treatment of water is related to temperature, pH level, and clarity of the water. Cloudy water often requires a higher concentration of the chemical to disinfect. There are tow types of chemical treatments: those using iodine and those using chlorine. Halazone tablets, iodine tablets, tincture of iodine and bleach can all effectively purify water. The organisms that cause dysentery can take a cyst form. Remember that water temperature, sediment level, and contact time are all elements in killing microorganisms in the water.

  Tincture of Iodine 2% liquid Add 5 drops per quart when the water is clear. Add 10 drops per quart when the water is cloudy. If viruses are a concern, the water should be treated with iodine.

  Halazone is an example of a chlorine tablet. It can be used for people with iodine allergies and other medical restrictions, for example, pregnant women, those allergic to shellfish are often allergic to iodine, people with thyroid problems, women over 50 years, or those on lithium. Always remember to follow instructions on the package's label.

Drinking Water Safety Guide

Microbiological Micron rating	Microorganisms Eliminated
.004	eliminates all microorganisms: viruses, bacteria, giardia
0.2 - 1.0	eliminates giardia and most bacteria but not viruses
1.0 - 4.0	eliminates giardia and other larger protozoa

3. Describe six natural indicators of a storm and demonstrate the actions that should be taken.

Being caught in bad weather can prove fatal. Before setting out, take note of the weather. Observe wind and pressure changes. Keep a record of the weather and the conditions which precede it and what they develop into.

- Animals are sensitive to atmospheric pressure and are good for short-term weather predictions. Insect-eating birds feed higher in good weather and lower when a storm is approaching. Humans can sometimes sense a change in the weather. Curly-haired people find their hair becomes tight and unmanageable as bad weather approaches. Those with rheumatism, corns or similar ailments suffer discomfort in wet weather.
- If camp fire smoke rises steadily, the weather is likely to remain fine. If it starts swirling or is beaten down after rising a short way, a storm shower is coming.
- Sounds carry further when wet weather is on the way and the smell of vegetation becomes more distinctive before the arrival of rain.
- A corona, a coloured circle visible around the sun or moon will enlarge if fair weather lies ahead and shrink if rain is likely. A rainbow in the late afternoon is another sign of good weather.

- Migrating geese maintain their altitude by sensing air pressure, the more the pressure, the higher they fly. Low-flying geese mean a falling barometer, an omen of bad weather.

Cloud Reading

It is difficult but not impossible to accurately make short-term weather predictions. Start learning to predict weather by watching clouds. You need to identify the cloud patterns in the sky, determine if the clouds are getting more or less numerous and are the clouds getting lower or higher in the sky.

Cloud Reading can be useful in understanding how weather systems work. There are three main types of clouds to keep an eye on:

1. Cumulus (puffy)

   Puffy white clouds indicate good weather but they can sometimes turn into darker clouds which mean thunder and lightning are coming. When these become anvil-shaped they are called thunderheads and foretell impeding bad weather. Cumulus clouds fed by warm updrafts of a cold front develop a towering form warning of an approaching storm.

2. Stratus (layered)

   These thin layered clouds are prevalent on hazy days. They may become thicker and dense enough to block the sun and a light rain may ensue. If they turn dark and get lower then a heavier rain is on the way.

3. Cirrus (wispy)

   Cirrus clouds have turned up ends that give them the nickname mare's tails and are formed before a warm front hits. They are the most elusive of clouds and can keep you guessing what they will do. Next comes cirrostratus, then mackerel sky, then rain.

Winds of Change

Wind is created when hot air rises and cold air falls. When you combine wind direction and clouds types then you can guess fairly well the coming weather. When clouds are moving fairly quickly across the sky, conditions can change rapidly. If the temperature gets cooler as clouds are getting darker, there is a good chance that foul weather will follow. If cumulus clouds appear in the distance and temperatures are on the rise, count on fair weather.

Familiar Sayings - What They Mean

Red sky at night, Sailor's delight.
Red sky at morning, sailor's take warning.

A red sunset is caused by the sun's rays filtering through dust particles and pollution. Since the weather in the west will likely reach you the next day, and a red sky indicates dry conditions in the west, the weather should be good the next day. A grey or yellowish glow indicates wet weather is on the way. A red sky in morning shows the sun lighting up high cirrus clouds, which may lower later on meaning wet weather will follow.

Mackerel skies and mares' tails
Make tall ships carry low sails

Skies filled with mares' tails (cirrus clouds) indicate that a storm may be on the way. Scattered, high altitude cirrus clouds usually indicate good weather unless their wisps or mare's tails point up or down which may mean rain.

Sound travelling far and wide
A stormy day does betide.

If voices seem louder or the clank of pots and pans seem more shrill, this may foretell of an approaching storm. As clouds lower in the sky, sound waves hit them and bounce back faster than usual. Once the clouds have lifted, sounds return to normal.

The moon with a circle brings water in her beak.

A halo around the sun or moon tells of approaching rain. The halo is the refraction of light off ice crystals in cirrus clouds. When cirrus clouds lower in the sky, rain may follow.

Rainbow in morning, sailors take warning;
Rainbow toward night, sailor's delight.

Rainbows seen from the east in the morning where the sun rises and shines on moisture in the west which indicate the approach of wet weather. By the same token, an evening rainbow seen in the east is being illuminated by the sun setting in the west which suggest that the wet weather has already passed.

Crickets Chirp Out the Heat

The hotter the day, the more a cricket chirps. You can actually determine the temperature by counting the number of chirps you hear in 15 seconds. Divide the number by 2 and add 6 and the answer will be in degrees Celsius. Now, that's heat with a beat!

Lightning from the west or northwest will reach you,
Lightning from the south or southeast will pass you by

Storm clouds and thunderheads come from the west or northwest and move east. If you see lightning in the south, the storm system has missed you; there is little likelihood that the storm will travel north to your location.

If smoke goes high, no rain comes by;
If smoke hangs low, watch our for a blow

Smoke rising from a campfire in a thin, vertical spiral reveals a high pressure system, therefore good weather. Smoke will stay close to the ground in the presence of a low pressure system, which may mean rain.

Test your weather knowledge. True or False.

- If rain is on the way, many flowers fold up their leaves or petals.

  True Clover folds its leaves and dandelions and tulips fold their petals.

- Spiders sometimes haul in their webs before the rain starts.

  True

- Some trees turn over their leaves before the rain to keep the tops dry.

  True Red and silver maples and poplars do this.

- Ants travel in lines before a rainstorm and scatter in dry weather.

  False

- Cows gather and bed down in the pasture before a storm.

  True

- Bees fly in circles before a rainstorm.

  False, but they do stay closer to the hive.

- If a house fly pesters you, rain is coming.

  True

- Dogs sniff the air more often before a rainstorm.

  True

- Noises are clearer and smells are stronger before it rains.

  True

- A rooster crowing at night means rain in the morning.

  False

How Far Away is the Lightning?

Count the number of seconds between the sound of thunder and the sighting of lightning and divide by three. That will give you an estimate in kilometers the lightning is away. When you hear thunder and see lightning at the same time-look out, the storm is overhead!

Weather Summary

There are five weather factors that should be watched for changes in weather patterns.

1. Cloud Formations
   - What types of clouds are there?
   - What direction are they moving?
   - How have the clouds changed throughout the day?
2. Wind Direction and Strength

   Winds occur when the earth is heated unequally by the sun. Warm air rises and is known as a rising air current. Cold air descends and is known as a falling air current. This leads to high and low pressure areas. The air in the high pressure areas will move to the low pressure air to try and equalize the pressures. This horizontal movement of air can vary from a light breeze to a heavy wind.
   - What direction was the wind blowing?
   - What strength?
   - Has the direction changed?
3. Temperature
   - Has the temperature fluctuated beyond normal?
4. Humidity
   - Has humidity changed, up or down? The warmer the air, the more moisture or water vapour it can hold. When air rises it cools. When the temperature of moist air drops to a point where the water vapour can change into droplets, clouds are formed.
5. Barometric Pressure
   - Has the pressure changed (beyond altitude changes)? Changes in air pressure are caused by the circulation of hot and cold air, and the resulting rising and falling of air.

Forecasting Tips

Wind Direction	Barometric Pressure	General Forecast
SW to NW	30.10 to 30.20	Fair, with little temperature change for 1 to 2 days
SW to NW	30.10 to 30.20 rising rapidly	Fair, with warmer weather and rain within 2 days.
SW to NW	30.20 or above, barometer steady	Remaining fair with little temperature change.
SW to NW	30.20 or above, falling steadily	Fair and slowly rising temperatures for about 2 days.
S to SE	30.10 to 30.20, falling slowly	Rain within 24 hours.
S to SE	30.10 to 30.20, falling rapidly	Rain within 24 hours, wind will rise
SE to NE	30.10 to 30.20, falling slowly	Rain within 12 to 18 hours; wind will rise
SE to NE	30.10 to 30.20, falling rapidly	Rain within 12 hours; wind will rise
SE to NE	30.00 or below, falling slowly	Rain will continue one or more days.
SE to NE	30.00 or below, falling rapidly	Rain with high winds in a few hours. Clearing within 36 hours, colder in winter.
E to NE	30.10 or above, falling slowly	Summer: Light winds, rain for 2 to 4 days. Winter: Rain or snow within 12 hours.
SE to NE	30.10 or above, falling rapidly	Summer: Probable rain in 12 to 24 hours. Winter: Rain or snow within 12 hours.
S to SW	30.00 or below, rising slowly	Clearing within a few hours, then fair for several days.
S to E	29.80 or below, falling rapidly	Severe storm within a few hours, then clearing within 24 hours, colder in winter.
E to N cold	29.80 or below, falling rapidly	Severe storm in a few hours. Heavy rains or snow storms, followed by wave in winter.
Swinging to W	29.80 or below, rising rapidly	End of storm, clearing and colder.

More Forecasting Tips When:

Look For:	Clouds	Temperature	Winds	Air Pressure	Humidity
Weather to stay fair	Move high and decrease in numbers when morning fog disappears	Average for the season	West to northwest and gentle	Remains steady or goes up slowly	Stays low
Weather to get worse	Become thicker, lower and darker to the west	Above or below average for the season	Shift between east and south	Falls steadily or rapidly	Goes up
Rain or snow	Change from cirrus to lower types or rain or snow clouds	Goes up	Increase in speed, usually from the east	Falls, the faster it falls the sooner rain or snow	Goes up
Thunder Storm	Change from cumulus to cumulonimbus		Increase in speed rapidly	Falls	
Weather to Clear	Rise and break up	Rises after warm front. Drops after cold front	Swing from east through south to west	Rises	Goes down
Colder Weather		Goes down	From north or northwest	Rises	
Warmer Weather		Goes up	From the south	Falls	

Weather Signs

Look for cloudy unsettled weather when:

- the barometer is falling;
- the temperature at night is higher than usual;
- the clouds move in different directions at different levels;
- high thin clouds (cirrus) increase. A large ring may appear around the sun or moon and remain there until overcast clouds thicken and obscure it; and
- clouds darken on a summer afternoon.

Look for steady precipitation when there:

- have been signs of unsettled weather;
- the wind is south or southeast, with pressure falling. If the pressure falls slowly, rain or snow will occur within a day; if it falls rapidly, it will rain soon, with increasing wind speed;
- the wind is southeast to northeast, with pressure falling it will rain or snow soon; and
- thunderclouds are developing against a south or southeast wind.

Look for showers when:

- thunderclouds develop in a westerly wind; and
- cumulus clouds develop rapidly in the spring or summer during early afternoon.

Look for clearing weather:

- the barometer rises;
- the wind shifts into the west or northwest; and
- the temperature falls fairly rapidly, especially during the afternoon.

Look for continued bright weather when:

- you can look directly at the setting sun and it looks like a ball of fire;
- the barometer is steady or slowly rising;
- cloudiness decreases after 3 p.m. or 4 p.m.;
- morning fog breaks within two hours after sunrise;
- a light breeze blows from the west or northwest; and
- a red sunset occurs.

Look for higher temperatures when:

- the barometer is falling (in summer a falling barometer may indicate cloudy weather which will be cooler than clear weather);
- the wind swings away from the north or west into the southwest or south; and
- the morning sky is clear, except when the barometer is high or is rising in wintertime, or if the wind is strong from the north or west.

Look for lower temperatures when:

- the wind swings from the southwest into the west, or from the west into the northwest or north;
- skies are clearing (clearing skies in the morning will likely mean warmer weather by afternoon, particularly skies in the summer);
- the barometer rises in the winter;
- snow flurries occur with a wet or north wind; and
- the barometer is low and falling rapidly, wind east or northeast and backing slowly into north (the fall in temperature will be gradual.)

Taking Cover

When rain and high winds hit, and they will at some point, you want to be dry and secure within your tent and comfortable from the battering winds and rain. Here are a few tips to consider when finding and making shelter.

- Calculate the speed of an approaching storm by measuring the time between lightning flash and the thunderclap. Lightning takes three seconds to travel one kilometer (five seconds a mile.)
- Avoid being in a boat on a lake during a storm.
- Canyons are dangerous because there can be a flash flood caused by a storm. Because of the thunder you will not be able to hear the noise of the water descending down the canyon.
- Take cover in the lowest, driest place around.
- Lightning seeks the tallest object around so do not go under isolated trees.
- Lightning is attracted to metal, so remove metal framed backpacks and store them away from you.
- If you have no cover at all, sit on your pack and put your back to the wind and rain. Huddle to keep warm.

Activity Ideas

- Have wardens arrange a trip to a local weather station. Ask around. There may be one at the airport, a government office, a local station cared for by a citizen.
- Make arrangements for a speaker to visit your club. Ask the speaker to bring slides, pictures and exhibits to help teach wardens about weather.
- Invite an experienced outdoor leader to talk about the weather encountered on various trips, how to better predict weather and be safe while on outtrips.

Last revised: 12/00

LEADER MANUAL

VII RESPONSIBLE HIKING AND CAMPING

As part of the Junior Forest Warden program, wardens and leaders are expected to use the out-of-doors responsibly. This role includes taking responsibility for personal safety and health.

date completed	✓		
_____	☐	Demonstrate food packaging techniques. Describe how the packaging considers spoilage, food preservation and protection from wildlife	page 103
_____	☐	Develop a cost-effective menu (not freeze-dried items) to feed a group of six for a week-long ski or backpack trip.	page 109
_____	☐	Discuss the philosophy of leave no trace camping and demonstrate leave no trace camping in the following skill and knowledge areas: food preparation and cooking, fire building and fuel selection, shelter, and waste disposal.	page 116
_____	☐	List ways you are responsible to and for others while planning a trip, during a trip and after a trip.	page 120

VII. Responsible Hiking and Camping

1. Demonstrate food packaging techniques. Describe how the packaging considers spoilage, food preservation and protection from wildlife.

Food Packaging

If you are using prepackaged foods from the outdoor store, you do not have to do any repackaging at home. Most of the packaging, however, you will want to discard (cardboard, foil) to repackage into your own packing system. The goal of packing food is to decrease the weight and the amount of garbage.

There are many packaging systems. One is using different sizes of sturdy re-sealable plastic bags such as Ziploc. There are other kinds of open-once bags that can be used such as tough baby bottle bags sold by the roll and boilable bags sold with a home bag sealing machine such as Seal-a-Meal or Meals-in-Minutes. These bags can be filled and sealed to any size desirable. Household bags can also be reused but check to see that there are no leaks. Clear bags are the most useful because you can see what is there. Add labels with freezer paper (which adheres well in damp conditions) or use permanent markers.

Pack each meal separately except for lunches. Lunch food for a several day trip are usually put into two large ziploc bags with a variety of food in each. The lunch bags contain food that will be used for every lunch like peanut butter, crackers, jam, nutella and so on.

All bags should be labeled with the contents and instructions in the simplest form. For example,

- lemon pudding add 1 1/2 c. water
- jello + 2 c water
- drink, add 4 cups

The jello and the drink will look the same through the ziploc but everything is labeled for clarity. Powdered foods that will be opened only once can be sealed in baby bottle bags. Trimmed baby bottle bags are the perfect size to hold drink mix and other foods in small quantities and are tougher than sandwich baggies. They can be sealed with a home bag sealer. (To guard against leaks , make two seals, .5 cm apart.)

For foods that you will dip more than once into the bag (like trail mix, candy, Russian Tea Mix) ziploc bags work well. When they are empty, they can be reused or compressed and packed out.

Bowl in a Bag

Foods that need mixing can be pre-packaged at home in one-quart or one-litre plastic ziploc bags that can double as collapsible bowls. No spoon or pot needed and no clean-up. Some of these foods are pudding mix and dry milk, biscuit/dumpling mix, pancake batter, sour cream and dry milk. Add required water and oil, push out most of the air, and shake vigorously. Wardens may stand in line for shaking privileges.

There are other uses for resealable bags, here are some examples: Add water to dried fruit and set aside to rehydrate and to save leftovers. All ingredients of a dish go together into a bag and all components of the meal (main dish, beverage, dessert) are grouped together in a larger bag. A meal is never stalled because one person has half the main dish and the sauce is in another pack or do a meal in a bag. Before you go, pack the oatmeal, raisin and banana chips, salt, sugar and dry milk all together in a ziploc bag and label: oatmeal, cook 1 min in 3 c water. Put smoked salmon in a double baggie, push all air out and wrap with freezer tape. Package juice for the meal and label, juice, 1 litre. Put the amount of Mexican Mocha needed for the group in a sealed bag and label: Mex. Mocha, + 4 c hot water. All the four bags go into a larger bag labeled: Breakfast Day I (or whatever day it will be eaten.)

Here's an example of how this system works.

Breakfast

Oatmeal with raisins and banana chips

Smoked salmon

Grapefruit juice

Mexican mocha

All the meals are prepared in the same way. Dividing up the meal load is just as easy. There are many combinations and variations depending on the number of people, the number of meals and the length of the trip. Below are some ideas for carrying the meal load:

- Have the early risers carry the breakfasts
- Have a different person carry the meals for each day. For example, Alex has Day 1 meals, Earl has Day 2, Joanne has Day 3, Taylor has Day 4 and so on. Give the days alphabetically to Wardens.
- Spread the load over the trip length. If it's a long trip, the alphabetical suggestion above would have some Wardens carrying meals until the last days. For a 10 day trip, an alternative is to have Alex carry Day 1 and Day 10, Earl Day 2 and Day 9, Joanne Day 3 and Day 8 and so on. You can also split up the day's meals. For example, lunches for

odd-numbered Days 1, 3, 5, 7, 9 are packed together. Lunch for even -numbered days 2, 4, 6, 8, and 10 are packed together. This works the same for breakfasts and dinners. This method will have all the meals being used alternatively and evenly from all the packs.

Tips/Suggestions

- Clip instruction from boxes and tuck into the smaller bags.
- Gather all the granola for one week and put into one ziploc bag.
- Have each person pack their own snacks.
- Plan the meals on paper first. Calculate the approximate number of bags needed and the sizes. When ready to re-package foods and organize meals, spread out on the kitchen table. Do the breakfasts first, then the lunches and then dinners. Decide on how the meals will be carried and by whom. Once decided, they can be packaged accordingly.

Some Ways to Figure Out Quantities

- **Eyeballing** - One handful of raisins looks about right for a one person snack. Measure and you'll discover it's 1/8 cup. One cup, therefore, is enough raisins for eight people.
- **Experience and Record Keeping** - Note how much you brought on the trip and record as to whether it was 50 % too much, just right, half as much needed, and so on. Keep notes. Your measurements will get better with experience.
- **Calorie Counting** - Determine how many calories per person, per day are required and calculate how that translates into food.
- **Cookbooks** - Many cookbooks will tell you how much rice per person constitutes a serving. Increase the suggested serving for outdoor activities.
- **Home Experimenting** - Invite hungry friends to try your recipes. If there isn't enough, treat them to a pizza and increase the recipe for the trip.
- **Package Directions** - If the package says, serves four, it doesn't really. It only serves four if there is another two or three food items on each of the four plates. Keep this in mind when planning a meal.

Use the 3 Rs When Packaging Food

Reduce the amount of packaging by buying in bulk. Choose items that are bulk packaged rather than individually wrapped. This will also help to reduce cost.

Recycle all cardboard, glass when re-packing food.

Reuse the plastic bags after a trip that have no holes. They can be washed out and reused. Even plastic peanut butter jars can be washed out and reused for another trip.

Food Preservation

Dehydration removes the moisture from the food so bacteria, yeast and molds can't grow. Drying also slows down the action of enzymes which cause food to ripen and eventually spoil. Drying food is a method of food preservation that is simple, safe and easy to learn.

Drying food is a slow process. All that is needed is a heat source. You can use an oven or a commercial food dehydrator. The temperature should be constant 95 to 105° F and adequate circulation to carry the moisture away. Drying time varies from 8 to 10 hours to three days. Fruits, vegetables and meat can be dried.

Doneness test are different for each food. The following are doneness tests:

- Food can crush to a powder: peas, carrot, mushrooms, zucchini chips, corn, whole berries and most other vegetables.
- Large fruit are leathery and pliable: pears, banana fingers (lengthwise cut) , prunes, apples, apricots, peaches and pineapple chunks.
- Food is crisp and brittle: banana chips, tomato slices.

Have Wardens make fruit leather at home and wrap in plastic food wrap for a trip. Dry it, you will like it!

Make Fruit Leather

1. Use very ripe fruit. Try a combination like berry/apple or banana/berry.
2. Use a blender to make the fruit into a pulp. Add liquid (juice, cider, water) just so you are able to blend.
3. The puree should be thick like applesauce. If thickening is needed, add apple which is high in pectin.

4. Pour puree onto plastic (like bread bag) and place on a cookie sheet on an oven rack
5. Dry at about 110° F until you can peel the sheet of fruit off the plastic cleanly. Don't over dry, it should be chewy but not stiff.
6. Store rolled in plastic food wrap and label. Pear and apple look the same, so does plum and cranberry.

Food Spoilage

On outdoor trips, long or short, hot weather will cause fresh foods and meats to spoil. Below are some guidelines for the length of time some foods will keep:

Fruits - Fresh hard apples, oranges and tangerines can be taken on the trail. Their time staying fresh will vary.

Cheese and Dairy - Only a few cheese are good for multi-day trips. Grated Parmesan and Romano (moisture content 34% or less) does not need refrigeration. Hard cheese like Cheddar, Colby and Swiss can go up to a week without refrigeration. Take powdered milk to conserve weight.

Meats - Hard salami, Pepperoni, smoked meats and jerky last for weeks without refrigeration. Canned meats and fish can last for a long time.

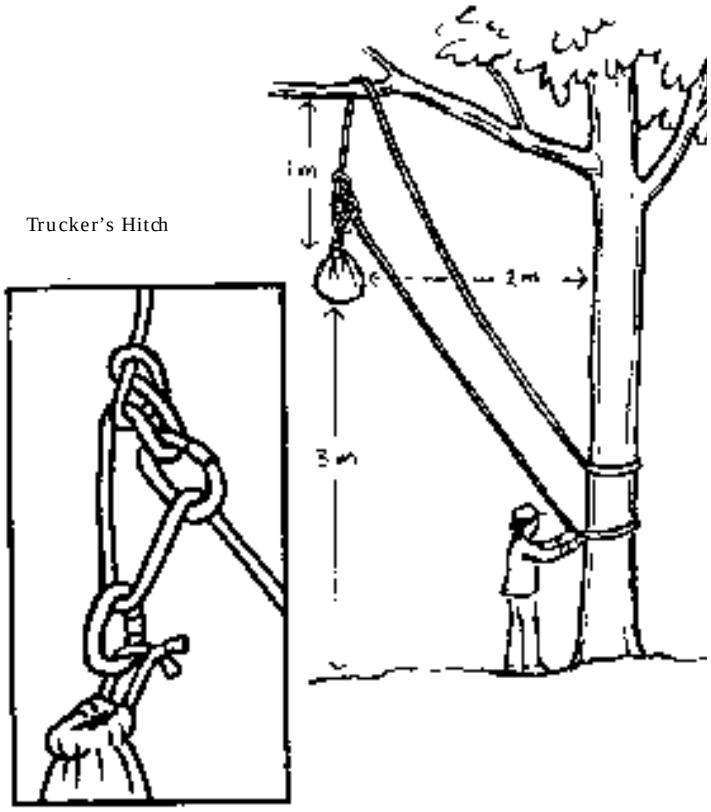
Eggs - Eggs can be carried for 2 to 3 days not refrigerated if they are cracked open and stored in a sealed jar (the eggs must be covered with water to remove the air.)

Tricks of the Food Trade

- Precook and freeze meals in plastic containers. The food will slowly thaw and be fresh on the second or third day.
- Cook food before you go. Fresh bread, biscuits, muffins, bean salad or humus are a nice treat along the trail.

Food Protected from Wildlife

In bear country, hang your food. You will need 30 metres of line and a sturdy stuff sack. Choose a tree at least 100 metres away from camp and hang the bag at least three metres above the ground , two metres away from the tree trunk and one metre below a branch. The smell of food can bring unwelcome visitors, so the camp kitchen should be about 100 metres downwind of the sleeping area.



Trucker's Hitch

Bears are not the only kind of animals interested in human food; insects and small mammals like mice and voles as well as wolverines will seek food. If your group has the luxury of space and carrying weight, pack food in a wooden box or plastic tub.

A food cache can also be rolled up in two or three layers of polyethylene. The plastic will mask any food odours. A food cache can also be buried under ground with a big rock covering the spot.

Improperly packaged and stored food may be suitable to dampness, mildew and rodent damage due to saltiness, freezing and cans rusting.

The cold water of streams and creeks may be used to keep food cold. Surround the food containers with rocks so they will not be swept downstream.

2. Develop a cost-effective menu (not freeze-dried items) to feed a group of six for a week-long ski or backpack trip.

Background

Proper nutrition is as important in the outdoors as it is at home. The amount of energy the body takes in from food is measured in units called calories. When planning a menu, the foods should be high in calories to meet your energy output in the outdoors. People have different metabolisms depending on how they eat and what they do.

Activity	Calorie Requirement	Food per day* (weight)
couch potato sedentary	1,500 - 2,000	varies
backpacking moderate exercise	2,500 - 3,000	.9 kg
cold weather hiking strenuous exercise	3,500 - 4,000	.0 to 1 kg
winter hiking/skiing very strenuous exercise	4,500 - 6,000	1.1+ kg

* Food weight required will vary because of the weight of hydrated foods.

Food Sources

1. Carbohydrates (4 calories/gram, energy released quickly)

   Carbohydrates normally make up half of a person's daily caloric intake, however, for outdoor activities such as skiing and hiking, carbohydrates should make up 70% of daily caloric intake. Sugars break down quickly and give quick energy; starches release energy more slowly.

2. Fats (9 calories/gram, energy released slowly)

   In the outdoors, fats should make up 25% of daily intake. During the winter this increases to 40% of daily caloric intake.

3. Proteins (4 calories/gram, energy released slowly)

   Proteins are the essential building blocks of body tissue. A

protein is made up of 22 amino acids; 14 are made in the body, the other eight (known as essential amino acids) are not. Meat, poultry, fish eggs and milk are complete proteins (have eight essential amino acids). Foods such as beans, lentils, peanuts, cereals, vegetables and fruits are incomplete proteins (do not have eight essential amino acids). Complete proteins are made with combinations of food groups. Below are some food combinations for complete proteins.

Dairy + Grains - macaroni and cheese, cheese and crackers, pasta and Parmesan cheese, milk and cereal.

Grains + Legumes - rice and beans, refried bead and flour tortillas, peanut butter and bread, rice/bread and tofu.

Legumes + Seeds - peanuts and sunflower seeds in trail mix.

Canada's Food Guide

Canada's Food Guide says eat a variety of foods from each food group every day. Energy needs vary with age, gender and activity. Foods selected according to the guide can supply 1,000 to 11,400 calories. For additional energy, increase the number and size of servings from the various food groups or add other foods. The Canada Food Guide gives a minimum and maximum number of servings for each food group. Most people choose servings somewhere in between. Use the Canada Food Guide to assist with meal planning.

Food Group	Size of Serving	Food	# of Servings a Day (Recommended)
Grain Products	125 - 175 ml 125 - 175 ml 1 slice	cereal rice, pasta bread	5 - 12
Fruits & Vegetables	125 ml 1	juice, vegetable fruit	5 - 10 (2 are vegetables)
Milk and Milk Products	250 ml 175 ml 45 g	milk yogurt cheddar cheese	adolescents 3 - 4 adults 2 - 4
Meat & protein substitutes	60 - 90 g 250 ml 2	meat, poultry, fish legumes eggs	2 - 3

GORP

Stands for Good Ol' Raisins and Peanuts. Make some by combining equal amounts of raisins, peanuts, Smarties, coconut, walnuts, carob chips, dates, dried apricots and sunflower seeds. It's good for you.

Benefits of Good Meal Planning

- Reduce garbage.
- Reduced weight of food you are carrying resulting in less fatigue.
- Reduced dependence upon campfires for cooking.

Cost Effective Tips

- Buy in bulk and package into individual meals.
- Package your own meals instead of buying convenient freeze-dried meals.

Typical Menu Items

Breakfast

granola
Cracklin'Oat Bran
Cream of Rice
7 Grain
cracked millet
scones
canned sliced bacon
Grapenuts
oatmeal
Cream of Wheat
dried fruit
rice pudding
dried hash browns
Pop Tarts

Note: Pack cereals that won't crush.

Lunch and Trail Food

dried fruit
nuts and seeds
cheese
fruit
energy bars
fresh fruit
fresh carrots
granola bars
peanut butter, jelly, honey
tuna
trail mix
jerky
crackers

bagels, pita bread, tortillas, English muffins

candy (hard candies, sesame snaps, caramels, jelly beans, malt balls)

Dinner

Cup of Soup	Risotto
Ramen noodles	pasta
instant rice	Uncle Ben's Quick Brown Rice
falafel	couscous
beans	instant potatoes
dehydrated vegetables	bulgar
pepperoni for pita pizzas	cheese

Note: Make one-pot meals and add other things to make a bigger meal.

Dessert

brownie mix	Bisquick
instant gingerbread mix	corn bread mix
cheesecake mix	pudding
Jell-O	cobbler
cookies	

Condiments

sugar (white, brown, raw)	drink crystals (lemonade,
honey or maple syrup	iced tea, Tang)
tea (black, herbal), coffee	margarine (squeeze Parkay)
(instant, ground)	oil
cocoa	spice kit (pepper, salt, chili
powdered milk	powder, garlic powder, etc)
vanilla	soy sauce (backpacker's
Worcestershire sauce	ketchup)
cinnamon sugar	Tabasco sauce
instant gravy	bouillon cubes
bacon bits	Crisco (better than butter
dried spaghetti mix	and oil)
popcorn	Miso

Planning the Menu

There are two methods Wardens can use to plan the menu on paper: Ration Method, and Meal-by-Meal Method. Wardens can repeat meals, for example, breakfast for days 1 and 5 can be granola. Both are explained in the Warden's Manual.

One Pot Possibilities

It's easy to create your own recipe for a one pot meal. Select one item from each column and combine them in quantities enough for the number of people. Use your imagination and your personal taste buds to determine what items will taste good together.

Meat or Meat Substitute	Pasta, Grains & other bases				
Fresh meat in cool weather	Noodles (egg, spinach, whole wheat)	Freeze-dried	Cheese sauce (add milk powder)	Salt, pepper	Sunflower seeds
Canned meats (chicken, turkey, luncheon meat, beef and gravy)	Macaroni (egg, whole wheat)	Commerically dried	Sour Cream sauce (add milk powder)	Herbs (sage, oregano, basil, etc.)	Nuts (chopped, slivered)
Smoked fish	Dried potatoes (instant, diced, shredded, sliced)	Onions in various forms	Stroganoff sauce (add milk powder or sour cream to most)	Bouillon (cubed or powder)	Shredded coconut
Canned fish (tuna, salmon, clams, sardines)	Rice (quick brown or white, parboiled)	Mushrooms	Spaghetti sauce	Paprika	Cheese (cubed, sliced, pore-grated)
Jerky (beef or fowl, chopped)	Bulgar (parboiled cracked wheat)	Sweet pepper flakes	Powdered soup mixes	Garlic (minced, powdered, fresh)	Margarine
Hard salami	Japanese instant noodles	Celery flakes	Gravy mix	Parsley (dried)	Sesame seeds
Sausage (Thuringer, Landjager)	Boxed mixes (Noodles Almondine, Macaroni and Cheese, Rice-a-Roni)	Mixed vegetable flakes	Teriyaki sauce	Chives (dried)	Wheat germ
Pepperoni	Hamburger Helper or similar one pot mixes (minus the package)	Some fresh ones that travel well: carrots, cucumbers, onions	Curry sauce Sweet and sour sauce	Curry powder	Roasted soybeans
Bacon or meat bar				Onion salt	Bacon bits
Freeze-dried ham, chicken, beef, shrimp				Celery salt	Onion flakes
TVP (textured vegetable protein in granular or chunks in beef, chicken, ham flavors)				Garlic salt	
				Soy sauce	

Ration Method Menu Plan

Breakfast

Food Items	Quantity/person/day	X Number of Days	= Trip Quantity

Trail Foods

Food Items	Quantity/person/day	X Number of Days	= Trip Quantity

Lunch

Food Items	Quantity/person/day	X Number of Days	= Trip Quantity

Dinner

Food Items	Quantity/person/day	X Number of Days	= Trip Quantity

Desserts

Food Items	Quantity/person/day	X Number of Days	= Trip Quantity

Meal-by-Meal Menu Plan

Breakfast

Trip Day	Food Items	X Quantity - 1 person	= Your Quantity
Day 1			
Day 2			
Day 3			

Lunch

Trip Day	Food Items	X Quantity - 1 person	= Your Quantity
Day 1			
Day 2			
Day 3			
Snacks			

Dinner

Trip Day	Food Items	X Quantity - 1 person	= Your Quantity
Day 1			
Day 2			
Day 3			

3. Discuss the philosophy of leave no trace camping and demonstrate leave no trace camping in the following skill and knowledge areas: food preparation and cooking, fire building and fuel selection, shelter, and waste disposal.

Background

Leave No Trace (LNT) is the name of an American program developed by the U. S. Forest Service and the National Outdoor Leadership School and other agencies in the United States. It is a national awareness campaign to help people travel in different ecosystems without disturbing the environment. In Canada, the program is called Tread Lightly. Whatever the name, the program philosophies are basically the same, minimum impact camping. Backcountry awareness means understanding how you can fit into the environment and leave no trace of your visit.

The way we choose to behave in the outdoors is influenced by our understanding of how people affect other living things. When we camp in an alpine meadow we affect the plants and animals which depend upon each other for survival. Understanding these interrelationships helps us feel a personal connection to the land, it gives us a reason for caring. We care by loving beauty, enjoying plants and animals, having an interest in nature, feeling a oneness with nature, being excited by discoveries and even by testing our strength and endurance in the wild.

Treading Lightly means:

Travel only on designated routes.

Respect the rights of others.

Educate yourself.

Avoid stream banks, meadows, wildlife.

Drive and travel responsibly to protect the environment and preserve opportunities to enjoy outdoor recreation on public lands.

The principles of leaving no trace are guidelines, not rules. Keep in mind the following when going into the backcountry:

- plan ahead and prepare
- concentrate impacts in high use areas or designated sites
- spread camp out where impact is unavoidable in pristine areas
- avoid places where impact is just beginning to be noticed
- pack it in, pack it out
- properly dispose of what you cannot pack out
- leave what you find
- use fire responsibly

A thing is right when it tends to preserve the
integrity, stability and beauty of the biotic community
It is wrong when it tends otherwise.

Aldo Leopold, A Sand County Almanac. 1949

Trip Planning

- Groups of 10 or less are ideal. It will reduce compaction of soil and minimize damage to vegetation.
- Know the regulations pertinent to the area you plan to travel through.
- Obtain a map and study the topographical features of your route. Find any fragile areas and possible campsites.

Trail Travel

- Stay on designated trails. Do not create switchbacks or new paths around puddles or boggy sections. Short cuts result in erosion and gullying and create unwanted parallel trails.
- If you are hiking off trail, stay away from sensitive areas like alpine meadows and water courses.
- Avoid stepping on plants by walking on rocks or compacted soil.
- Where trails do not exist, use a map and compass for navigation.
- Do not mark vegetation with axes to mark your route.
- When travelling in an alpine environment where trails do not exist, have your group spread out instead of walking single file.

- Do not drop litter along a trail or waterway, carry along a plastic bag for this purpose.
- When taking a rest break, move off the trail to a durable place such as a rock outcrop, sandy area or a non-vegetated area.
- Do not approach or harass wildlife.

The Campsite

- Use designated campsites whenever possible or camp well off the trail
- Avoid camping too close to natural beauty spots and open water since these already suffer from overuse.
- Choose a campsite at least 60 metres from water sources, trails and scenic spots.
- Set up the camp thoughtfully in terms of traffic patterns. The cooking area should be well separated from the sleeping area, food hanging site, hand washing area, latrines, and where the water source is. Minimize the traffic patterns.
- Lug-soled hiking boots do damage to vegetation and soil. Sneakers are good around the campsite.
- Use a tent with a waterproof floor. Avoid scarring campsites from the construction of lean-to shelters and bough beds.
- If you are in the back country, use a camp stove. It leaves no scars on the environment.
- Try not to spend more than a few days at any one campsite unless it is an established campsite of sacrificed area.
- Leave the area as you found it or better. If you have cleared the ground of pine cones, scatter them back before you leave.
- Pack everything that you brought in.

Waste Disposal

- Dispose of human waste (feces) at least 100 metres away from water sources or trails.
- A cathole is a small pit toilet for personal use. Dig a hole 10 to 15 cm diameter and 15 to 20 cm deep. Remove the sod intact. Bury the feces and cover the site with natural materials to disguise it.

- A latrine is a larger pit toilet for group use. A latrine is the same size as a cathole except it is deeper. Remove the sod intact. Each person covers the feces with a layer of dirt. Fill in the hole, scatter the extra dirt and cover with natural materials before leaving the campsite.
- Toilet paper may be burned or buried.
- Depending on the location of the trip (cave), feces and urine may have to be packed out.
- A sumphole may be dug to dispose of waste water instead of being dumped on to the ground. A sumphole is dug 25 to 30 cm deep. It can be located near the cooking area but at least 60 metres from open water. Use biodegradable soap (without phosphates) to prevent contamination.
- Pack out all food garbage. Do not bury food wastes because wildlife can find it and dig out garbage pits, even in winter. Hang food garbage, the same method for food storage.
- Medical waste such as soiled bandages and needles must be stored separately in special bags for this purpose.

The Campfire

If your camp stove doesn't work or an emergency necessitates the use of a fire, follow the techniques below:

- Use an existing firepit to avoid creating a new fire scar.
- Never build a fire on top of dead logs, tree roots or mossy areas.
- Select a site on level ground, sheltered from high winds and away from overhanging branches and heavy brush.
- Never leave a fire unattended.
- Have a convenient source of water nearby to extinguish the fire.
- Dig up a square piece of sod about 50 X 60 cm keeping it intact and lay to one side.
- Use only dead wood found lying on the ground. Do not break off branches or use saws and axes. They all leave unnecessary scars.
- Build a small fire instead of a big one.
- Don't ring the fire with rocks because the rocks will be scarred.
- After breaking camp, make sure the fire is out by feeling the ashes with your bare hand. Take the ashes into the

woods and scatter them so they won't be visible or alter the soil's chemistry. Finally, return the soil to fire pit, replace the sod and fill in the edges with soil.

Water

- Camp and defecate at least 60 metres from a water source.
- Avoid using soap with phosphates.
- Wash hands and dishes in a basin and dispose of water with soap into a sumphole. If you was washing hands in a creek, use sand or gravel for an abrasive.

4. List ways you are responsible to and for others while planning a trip, on a trip and after a trip.

Planning a Trip

Albertans are lucky enough to be close to hundreds of parks and wilderness areas and can get there fairly easily. Being there for most people involves a fair amount of planning, especially if this is your first time out for the year. You need basically the same equipment for a weekend trip as you would for a week-long trip. The only variable is food, the longer the trip, the more food you will need.

Plan of Action

- Pick a departure date and decide on the length of the trip.
- Delegate someone in charge of transportation. The group has to get to the trailhead or the campsite.
- Decide who the group leader is. The trip will provide a Warden with an opportunity to practice planning skills. Different members of the group can be in charge of different things, for example, a person with paddling strengths can be in charge of that part of the trip.

Booking Sites

In some of the more popular locations, it may be difficult to get a reservation for a campsite. If you can't go in during the off-season, be sure to book your campsite as far in advance as possible. Some parks have four-month waiting lists for campsites. On long weekends, you may need to reserve a site six or seven months ahead of time. Some campsites even have lotteries for much-in-demand campsites. The West Coast Trail on Vancouver Island has a two year wait and that's just to hike the trail. Plan as far ahead as possible.

Trip Registry

Leave a written trip itinerary with friends and family (people who care about you.) In some cases, consider leaving the trip plan with RCMP if you are embarking on a long canoeing trip or with Park officials if you are going into the backcountry. Highlight the route on a copy of the map. Include:

- the name and emergency phone numbers for group members
- description and location of vehicle(s)
- departure and expected return times
- route and likely campsites
- alternate route and circumstances under which you would use them
- list of visually distinctive equipment
- who to contact if you are overdue and how long to wait before calling for rescue.

Should you run into trouble, leaving an itinerary can save crucial hours or days. If you are lost, feeling assured that someone knows where to look and will soon be searching for you can keep panic in check.

Weather

Check out weather advisories before heading off. A weekend postponed is a weekend gained another time. As with any kind of outdoor event, plan for contingencies and agree on a rain check date for another trip.

Gauge Abilities

If some Wardens are new to the trip and the skills involved, ensure there is some instruction and practice before the actual trip. Everyone should be comfortable with the activity being undertaken, whether it is hiking or canoeing. Try and plan outdoor adventurers with a partner or a group, never alone.

During the Trip

Safety

When a group is inexperienced, the leader should not take unnecessary risks. All group members should feel comfortable with the challenges presented during the trip. Good planning will ensure, for example, that the class of rapids on the river during a canoeing trip is suited to the skills and abilities of the group. Presenting challenges above and beyond the group's abilities is foolhardy!

Expect the Unexpected

Your trip may be ruined by downpours or a plummeting temperature. The best thing you can do is to be prepared and not to get mad when these things happened. Anticipate the worst by including bad weather gear in your pack. Pack a book and read it while the rain pitter-patters against the tent fly.

After the Trip

When you return, be sure to check in so your friend or officials with whom you left the trip itinerary with know that you are back!

If you have left an itinerary with wilderness authorities and you have not returned when you said you would, officials usually wait until you are one or two days late before sending out a search party to find you. Be sure to inform officials when you have finished your trip. When you exit some trails, there may be a box to deposit a card indicating that you have returned. This is important, you may be billed for search and rescue costs if you neglect to inform authorities.

Activity Ideas

- Have Wardens brainstorm factors they should consider so they are responsible to all members of the group while planning a trip.
- Have Wardens prepare a list of things to do before the trip to ensure group safety.
- Have Wardens practice writing out trip itineraries. Even if you are all going out for a weekend at a regional camp with your own family, write out an itinerary and leave it with a relative. Wardens can also prepare an itinerary that can be left with their own families if they are going on a hiking trip. Have a short meeting prior to the distribution of the itinerary to verify that all the information is correct.

LEADER MANUAL

VIII. KNOTS AND LASHINGS

Learning common knots and lashings and determining when to use them are skills that will aid in shelter construction, survival techniques, first aid and outdoor recreation activities.

date completed	✓		
_____	☐	Make a shelter or an outdoor tool using cords and demonstrate the proper use of three knots and two lashings.	page 127
_____	☐	Construct a knot display board which includes the name and use for at least eight knots.	page 130
_____	☐	Make cordage out of natural materials.	page 131

VIII. Knots and Lashings

1. Make a shelter or an outdoor tool using cords and demonstrate the proper use of three knots and two lashings.

Background

There is a knot for every job and it is important to know which knots will do the job. Wardens should know how to tie knots well enough to tie them in the dark and behind their backs. Practice. Practice. Practice. They should also be able to untie them. Knots must be done well enough so they do not come undone, but are able to be untied at crucial times.

Lashings

The method of lashing depends on the position of the components. Lashings tie down or attach objects together so they will not move. Knowing how to lash is valuable for making shelters, rafts and other structures.

Activity Ideas

- Have Wardens do the activity sheet, What Knot Would You Use? Wardens have a copy in their own manuals. Answers: 1-taut line hitch, 2-two half hitches, 3-sheepshank, 4-bowline, 5-clove hitch, 6-clove hitch, 7-timber hitch, 8-square knot, 9-sheepshank, 10-sheet bend, and 11- Jam Knot.
- Have Wardens demonstrate the knots that are the correct answers for What Knot Would You Use?
- Have Wardens demonstrate at least one knot from each category (simple knots, joining knots, loop-making knots, hitches, shortening ropes and securing loads)
- Have Wardens in the group demonstrate three knots and their practical applications.
- Have Wardens make a lean-to using three knots and lashings.

Refer to Appendix II - Knots, Lashes and Splices for descriptions and drawings.

What Knot?

Warden

Put a check mark ✓ by the knot you think will do the job and demonstrate the knot to another Warden.

1. What knot would you use for adjusting tension on a tent guy line?
   - bowline
   - timber hitch
   - taut line hitch
   - figure -of-eight
2. What knot would you use around a post and through a ring or grommet?
   - timber hitch
   - figure-of-eight
   - two half hitches
   - square knot
3. What knot can be used to bypass a damaged section of rope?
   - sheepshank
   - two half hitches
   - square knot
   - taut line hitch
4. What knot is used to make a loop that will not close?
   - two half hitches
   - bowline
   - clove hitch
   - figure-of-eight
5. What knot is good when the standing part of the rope is pulled straight out from a pole or post?
   - bowline
   - clove hitch
   - taut line hitch
   - two half hitches
6. What knot is good for tying a boat to a dock?

- bowline
- clove hitch
- timber hitch
- two half hitches

7. What knot would you use when you want to use a rope to drag a log?
   - clove hitch
   - square knot
   - bowline
   - timber hitch
8. What knot would be good for tying packages and bandages?
   - clove hitch
   - taut line hitch
   - square knot
   - bowline
9. What would you use to shorten a rope?
   - figure-of-eight
   - taut line hitch
   - timber hitch
   - sheepshank
10. What would you use to tie together two ropes especially if they are of different thicknesses?
    - square knot
    - sheet bend
    - bowline
    - timber hitch
11. What knot can be used instead of lashing?
    - bowline
    - timber hitch
    - jam knot
    - square knot

2. Construct a knot display board which includes the name and use for at least eight knots.

Wardens will make a simple display using a firm backing and two colours of rope. You may see a knot display board inside a fish restaurant. They are large, about one by two metres, on a nice piece of finished wood, varnished, and with a variety of knots made with thick white nylon cord. The Wardens do the same sort of display, however, it is costly. Wardens can make a nice display on coloured matte board used by picture framers. Their knot display does not have to be large, somewhere around 40 cm X 50 cm.

Refer to Appendix II -

Knots, Lashes and Splices for pictures and instructions on the various knots Wardens can choose from.

Materials Required

- two colours of the same kind of rope
- white glue (dries clear)
- markers, labels
- plywood, thick matte board (comes in a variety of colours)
- reference materials
- adhesive hooks for hanging

Procedure

1. Encourage the Wardens to make their display board as professional looking as possible. Be tidy, neat and make it so that you will be proud of it in five years. Remind them that they will also use it when they need to brush up on their knots. They can hang the display board in their room.
2. Have Wardens decide on the knots they will each have on their own display boards.
3. One Warden may do the labels on a computer in various fonts and sizes.
4. Have Wardens prepare a shopping list. Wardens may decide to purchase one matte board and divide it up amongst themselves. For example, a matte board can be purchased 32" X 40" (approximately 80 cm X 100 cm) for about $20.00. Four Wardens agreeing on the same colour of matte board can cut the matte board into four pieces, each measuring 40 X 50 cm for their display boards.

5. Choose an appropriate rope that is thick enough to show the twists and turns in the knots. Use two different colors so Wardens are able to determine the method of tying the knot.
6. Cut the knot leaving two to three cm of ends. Have wardens apply heat or glue to the ends of the rope to prevent fraying. The ends of the ropes may also be whipped or wound neatly with tape.
7. Before gluing the knot onto the display board, have Wardens draft where each knot will go so there is even spacing between the knots and labels. A book or some pressure may be applied so the knot lies flat and adheres properly to the board. Glue on a label identifying each knot or make a legend and glue it on the back.
8. Make a border around the edge. Braid rope or use a thick rope to frame the knots. Glue to the board.
9. Centre the adhesive hook on the back of the matte board so Wardens are able to proudly hang their knot display at home.

3. Make cordage out of natural materials.

Background

Vines, grasses, rushes, barks and animal hairs can be used to make rope or cordage. Cordage is a generic term for all cords, lines or ropes. The stems of stinging nettle make a first class cord. The stronger the fibre, the stronger the rope. Some stiff fibres can be made flexible by soaking, steaming or warming.

Sources of Fibres

- Stinging Nettle (Urtica dioica)

  This is an excellent fibre but it requires a lot of preparation. Choose the oldest plants and ones with the longest stems. They can grow up to 2 metres (7 feet) high. Soak them for 24 hours, lay them on the ground and pound them with a smooth stone. The pounding sheds the outer surface exposing the fibrous centre. Tease and comb to remove the fleshy matter called pith. Hang to dry. When dry, remove and discard the outer layer. Work the fibres into long threads, plaiting and twisting together to make a strong rope. Wear gloves when working with stinging nettle!

- Bark

  Willow bark produces a
  the new growth from yc
  dead inner bark of falle
  branches can be used.
  for strength if it looks li
  has decayed too much.

- Roots

  The surface roots of ma
  make good lashings. Tl
  run under, or even on t
  are often pliable and str
  roots of the spruce are

- Rushes, Sedges, Grasse

  Use when still green an
  longest stems.

Stinging Nettle

Testing Fibres

Tie two lengths together using an overhand knot. Using a reasonable amount of strength, try pulling them apart. If it snaps, the fibres are too brittle. If it is too smooth, it will slip apart. A good fibre will "bite" and hold together

Plaiting Rope

This is an easy method for
inexperienced. Make three
which can be plaited togeth
thicker, stronger rope. When lengthening the strands in the plait, stagger the places which feed in the new fibres. Take a bundle of fibres, tie the ends together and anchor it firmly. Split it into three separate strands and braid (bring the left strand into the centre and then the right into the centre and so on.) Keep twisting the strands and keep plaiting as tight and even as possible.

Spinning a Rope

Twist fibres together clockwise (more importantly, always in the same direction). Feed in lengths of new fibres as you go so that their ends are staggered.

When there are three lengths of fibres, anchor all three at one end and continue to twist each of them until quite tight. Draw all three strands together and twist all 3 counter-clockwise, the opposite direction.

Continue to add and twist until you have produced the amount of rope required. Secure a completed section to keep it tight as twisting continues. Wrap the rope around a tree trunk to keep the working length short.

A thicker rope can be made by repeating the process with three ropes that were just made. Or plait three simple ropes together.

Supporting Reference

Northern Bush Craft. Mors L. Kochanski. Lone Pine Publishing. Edmonton, Alberta. 1987. 287 pages and a color photo supplement.

Mors has a whole chapter in his book entitled, Bindcraft, Chapter 5, pages 145 to 156. He covers cordage techniques, different cordage materials and their uses, and the binding tie.

LEADER MANUAL

IX. SURVIVAL

Making and learning how and when to use a survival kit is taught through the aid of survival situations.

date completed	✓		
_____	☐	Describe factors affecting survival	page 137
_____	☐	Describe the priorities of survival	page 139
_____	☐	Practice a pattern for staying alive for one full day. Demonstrate proficiency in the use of map and compass, shelter, fire, selection of food sources, natural navigation aids, emergency first aid, signals, and dealing with boredom.	page 141

IX. Survival

1. Describe factors affecting survival.

Background

Mors Kochanski says that the less you know about the wilderness, the more you may have to bring on an outing. The difficulties you may expect in a survival situation are cold, pain, hunger, thirst, insects and loneliness. Forethought and experience may allow you to accept the realities and prepare you for the inevitable psychological reaction. How strong is your will to live?

Pain, cold, thirst, hunger, fatigue, boredom and loneliness, every one has experienced these, but few have known them to the extent that they have threatened survival. In the survival situation, the feelings of pain, cold, etc. are no different from those experienced elsewhere, however they are more severe and more dangerous. As with anything, the more you know about them and their effects on you, the better you will be able to control them, rather than letting them control you.

Factors affecting Survival

1. Fear

Should you become lost or confused, your immediate problem is fear. Fear is a normal response for anyone faced with an emergency. Fear influences your behaviour and your chances for survival. There is no advantage in trying to avoid fear by denying the existence of danger. It is important to realize that your fear should be accepted as a perfectly normal reaction rather than a shameful one. How you react to fear depends more on yourself than on the situation.

2. Pain

Pain is nature's way of making you pay attention to something that is wrong with you. But nature also has ways of holding off pain if you are too busy doing something else to pay attention to the injury at that moment. Pain may go unnoticed if your mind is occupied with plans for survival. On the other hand, once given in to, pain will weaken the drive to survive. Pain can get the best of you if you let it, even if it isn't serious or prolonged. A special effort must be made to keep hopes up and to keep working.

3. Cold

Cold is a much greater threat to survival than it sounds. It not only lowers your ability to think, is also tends to lower your will to do anything but get warm again. Cold is an insidious enemy. At the same time that it numbs the mind and body, it numbs the will. When it is hard to move and you want to sleep, do not forget your goal...to survive.

4. Thirst

Thirst is another factor in survival. Even when thirst is not extreme, it can dull your mind. As with pain and cold, thirst can be almost forgotten if the will to survive is strong enough. It is also important to remember not to deprive oneself unnecessarily of water. Serious dehydration may occur in a survival situation even when there is plenty of water.

5. Hunger

Hunger is dangerous because of the effects it can have on the mind, primarily in lessening the person's ability for rational thought. Both thirst and hunger increase a person's susceptibility to the weakening effects of cold, pain and fear.

6. Fatigue

Even a very moderate amount of fatigue can substantially reduce mental ability. Fatigue can make you careless. It becomes increasingly easy to adopt the feeling of just not caring. This is one of the biggest dangers in survival. The misguided notion that fatigue and energy expenditure are directly related may be responsible for many deaths in survival situations. Certainly, there is a real danger of over-exertion, fatigue, frustration, or boredom. Fatigue may represent an escape from a situation which has become too difficult. If you recognize the dangers of a situation, you can often summon the strength to go on.

7. Boredom and Loneliness

Boredom and loneliness are two of the toughest enemies of survival. They are bad mainly because they are unexpected. When nothing happens, when something is expected and doesn't come off, when you must stay still, quiet and alone, these feelings creep up on you.

2. Describe the priorities of survival.

Background

A pure survival situation is one where there is an immediate or long term threat to life, where the only feasible plan of action is to stay alive as long as possible, with the hope of being rescued.

The essence of survival is to be able to sleep comfortably when you need to and drink enough water to maintain the bodily functions at an optimum level. Outside of life threatening injury, an immediate concern is maintaining a comfortable body temperature. In cold conditions this is accomplished by dressing adequately, knowing how to preserve or maintain the insulative integrity of your clothing and supplementing any inadequacy with fire and shelter.

Priorities of Survival

1. **Accept that you are in trouble.**

   The bush is neutral. It is neither for nor against you. The bush is not out to help or harm you. Your greatest success depends on a calm and collected attitude backed up with the resolve to do the best you can under the circumstances. It is mentally and physically exhausting when one strikes out at inanimate objects. Things become more difficult if you are unable to develop a positive attitude. Review your emergency plan.

2. **Apply first aid.**

   If anyone is injured, apply first aid right away.

3. **Build a fire.**

   A Warden should be able to build a fire under any circumstances. In the cold it makes sense to light a fire immediately to keep warm, rather than building one later to thaw one's self out. Once a fire is established, the next concern is collecting an adequate stock pile of fuel to last until the next day. If it is not raining or snowing there may not be any immediate need for a shelter. It may be enough to sleep between the fire and fuel supply.

4. **Build a shelter.**

   Weather conditions may require the construction of a shelter to provide an improved micro-environment wherein one may comfortably work, rest and sleep. The most

universally useful shelter is the open lean-to with a fire in front of it. It must block any movement of air on the three sides away from the fire, and it must be close enough to absorb at least some of the radiant energy from the fire to create a warmed micro-environment.

5. Find water.

Dehydration is a life-threatening condition. Thirst is a poor indicator of bodily needs, and one should use additional means to ensure an adequate intake. Drink enough to pass at least one litre a day. The urine should be virtually colourless. Drinking will avert headaches, strong hunger pangs and fatigue.

6. Keep yourself warm.

If you cannot touch your little finger to your thumb on the same hand, you should immediately build a fire and seek shelter.

7. Set up signals.

Wardens should know how to signal with a mirror, how to build signal fires and the standard ground to air signals. The standard signals are:

- the big "X" means "I am not able to proceed."
- 3 shots, 3 honks or 3 blasts on a whistle means help
- two of anything means "Please respond."

8. Conserve Energy

Do not rush things. Do tasks properly the first time so that you do not have to find the energy to do them right the second time. Rest often. If you are lost, stay put and conserve energy. Take time to allow your body and mind adjust to your current predicament. Choose to live by the Rule of Four's:

- If you have no water, by knowing how to apply conservative measures you should live longer by four days.
- If you have no fire but you are adequately dressed for temperatures below -40° C you should be able to survive at least four days.
- Without adequate protection you can reach an irreversible state of hypothermia in less than four hours.
- If you have no food, you should get by at least 40 days (in summer) with no permanent damage to your health.
- Allow yourself and your rescuers at least four days before you embark on any significant decision such as walking out.
- Think over anything you plan to do at least four times from four different angles if possible.

3. Practice a pattern for staying alive for one full day. Demonstrate proficiency in the use of map and compass, shelter, fire, selection of food sources, natural navigation aids, emergency first aid, signals, and dealing with boredom.

Wild Edibles

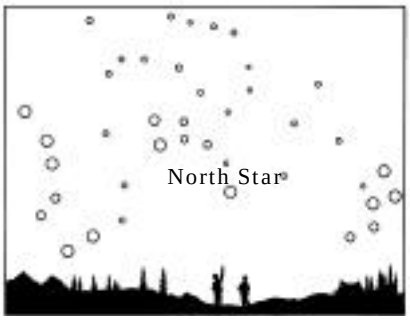
See Appendix III - Wild Edibles

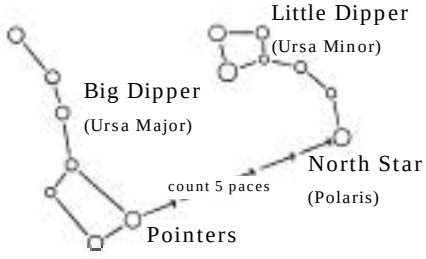
Natural Navigation Aids

The North Star Will Help You Find Your Way

Identifying the North Star, also known as Stella Polaris or just Polaris, is a good way to figure out which way is north. Its bearing will never be more than two degrees from true north (unless you are in the Arctic.)

One way to find Polaris is to locate the big Dipper. The Big Dipper has seven stars in the northern part of the sky. Trace an imaginary line between the two stars that form its front lip and extend this line five times its own length to Polaris! Polaris is the top star on the handle of the Little Dipper which is pouring into the Big Dipper.





Sun or Moon

Insert a short stick in the ground and mark where the tip of its shadow falls. One hour later, mark again. The line between these marks is roughly east-west. The stick will be on the south side of the line.

Old-fashion Watch

Insert a twig into level ground. Place the watch with the hour hand pointing toward the twig, aligned with its shadow. If the watch is set to standard time, halfway between hour hand and 12 o'clock is south.

Improvised Compass

A piece of ferrous metal wire, a sewing needle is ideal, stroked repeatedly in one direction against silk will become magnetized and can be suspended so that it points north. The magnetism will not be strong and will need regular topping up. Suspend the needle in a loop of thread so that it does not affect the balance. Any kinks in or twisting of the thread must be avoided.

Stroking with a magnet, should you have one, will be much more efficient than using silk. Stroke the metal smoothly from one end to the other in one direction only.

Plant Pointers

Plants can help you find north and south. They tend to grow towards the sun so their flowers and most abundant growth will be south in the Northern Hemisphere.

On tree trunks moss will tend to be greener and more profuse on the south side. The north side will be yellowish to brown. Trees with a grainy bark will also display a tighter grain on the south side of the tree.

Wind Direction

If the wind direction of the prevailing wind is known it can be used for maintaining direction. There are consistent patterns throughout the world but they are not always the same the whole year round.

Birds and spiders will usually build their nests and webs in the lee side of cover.

Signals

All major distress signals are in units of three: three gun blasts, three whistle blasts, three car honks, three smoke puffs, three blazes on a tree and so on. Two of anything means please respond. Signals are transmitted in four ways: sight, sound, light and radio transmission.

1. **Sight** - Where a message is seen, for example, use blazes, hand signals, ground signals, smoky signal fires.
2. **Sound** - Using the voice, whistles, gun, or horn.
3. **Light** - Use flares, lights, mirrors or fires.
4. **Radio transmission** - Use an amateur radio transmission, citizen band or GPS (Global Positioning System.)

Signal Fires

A signal fire may be the only means of attracting attention in some circumstances. A good signal fire should fulfill the following requirements:

- it should produce a large volume of intense smoke
- the smoke should reach the tree tops within three minutes even in wind
- the fire should be easy to light.

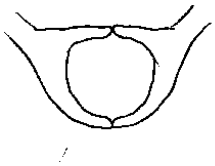
There are various types of signal fires. Some are simple, quickly built and burn for a relatively short period of time. At the other extreme, a signal fire may take considerable effort to build and the end result may be quite spectacular.

Site of Signal Fire

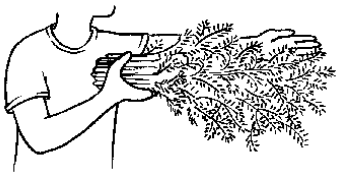
Pick terrain that is apt to be checked first by searchers, such as edges of lakes or rivers. Clearings are better than thick stands of trees. Avoid any monotonous type of setting. Other ideal requirements of a site are:

- The signal fire should be close to camp so that it can be lit at a moments notice.
- The site should provide an abundance of boughs for the signal fire.
- The signal fire should be built near water. If the fire hazard is high, build the fire on sandy or rocky ground.
- Build the signal fire downwind and at least 50 metres away from your gear. Sleeping bags, clothing (especially nylon) and other equipment could be damaged by the burning needles that the signal fire will produce.

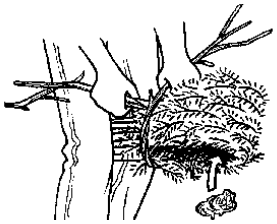
25-30 cm circumference of twigs



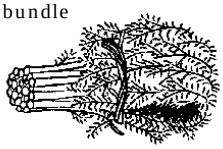
Twig length



Bend ends towards centre of bundle



Twig bundle

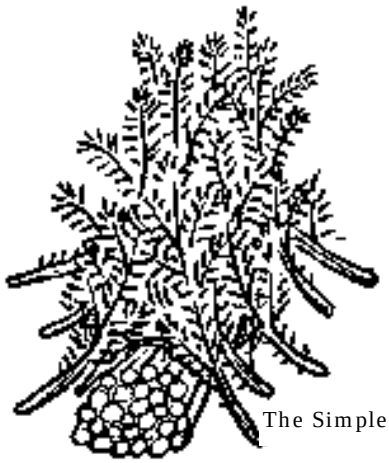


Simple Signal Fire

The simple signal fire requires no tools and takes only minutes to build. This type of signal may be held in a reserve while the proper signal fire is being built. Also. If one is travelling or is expected to be caught away from camp, it may be worthwhile to carry the bundle of twigs so as to be able to make the signal fire where ever you are.

Kindling

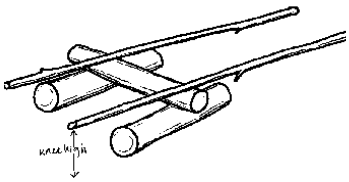
Gather a large bundle about the size of a hug of fine, dry twigs, preferably, but not necessarily, spruce. The branches used should range from elbow-to-finger tip to armpit-to-finger tip in length. Have all the but ends at one end of the bundle. When compressed the bundle should be at least 25 cm in circumference. Bind the bundle with spruce roots, grass cord or willow withes. The fine ends of the bundle are folded inward into to concentrate the dispersed tips so that they will ignite more readily when a flame is applied.



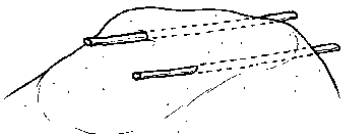
The Simple Signal Fire

The Standard Signal Fire

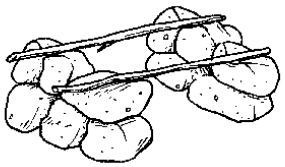
The standard signal fire produces a maximum of effect with a minimum of effort. If necessary this signal can be built without an axe or knife, because spruce boughs are easily broken off with the hands.



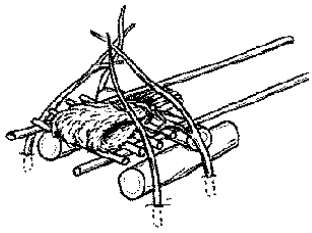
Common Support



Method of Making Fuel Support in Winter



Using Rocks and Poles to Make the Fuel Support



The Framework to be used with bundles or feather sticks

Building the Signal Fire

Lay down the bundle, fine ends to the wind. Pile a few sticks, thumb-to-broom handle thick in a teepee fashion over the bundle. Cover this with 10-15cm of spruce boughs, or leafy green branches, teepee fashion, with the butt ends down. If boughs are not available use moss or grass or the organic material on the forest floor. The fine ends of the bundle should be uncovered, or left uncovered, to provide easy access for lighting the signal fire.

The Standard Signal Fire Fuel Support

Select two dry or green poles that are approximately 5 cm in diameter in their thin ends. Set up the poles about 25 to 30 cm apart and roughly parallel to the ground at knee height. The poles should extend beyond their supports the length of the finger tip to the elbow. This can be done in a number of different ways. This fuel support arrangement provides an easy access for lighting the kindling and allows for an unrestricted oxygen supply.

Kindling and Fuel

The kindling can be a bundle of twigs as is used in the simple signal fire. If this type of kindling is used, a grate is made by laying four or five sticks of thumb thickness across the pole ends. This keeps the bundle from falling through as it burns. If a knife and axe are available, the bundle can be replaced with 15 to 20 feather sticks. The feather sticks can be stacked in log cabin fashion with the feathers to the inside. To help sustain the fire, thumb stick fuel is loosely stacked behind the feather sticks or bundle.

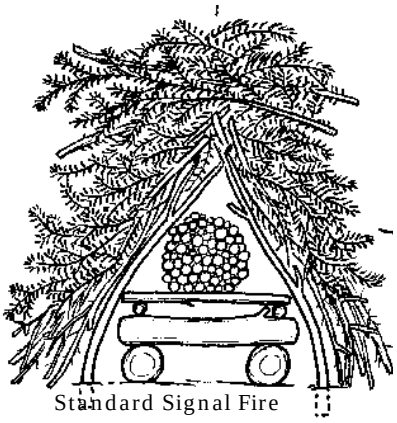
The Framework

To support the boughs over the feather sticks and to keep the signal fire from falling over as it burns, a framework is made with four larger boughs that are stood up teepee fashion with the stems pressed into the ground. If larger boughs are not available, saplings or any straight poles can be used. Bend or snap any tips of the boughs projecting out of place so that they will lie down.

The Cover

The bough cover is now placed onto the framework. The boughs are placed stem upward with the underside of the bough to the outside as in shelter building. This protects the fire from rain. About 75 boughs are required. The front of the cover generally does not extend below the kindling and the fuel. The cover should be about 15 to 20 cm thick with a cap to help keep the kindling and fuel dry in case of rain.

Tactics


Standard Signal Fire

If time and energy permits, a number of signal fires may be built and kept in reserve. If the first signal is missed, another aircraft may pass overhead before you have built a new signal fire. On clear days you can light a signal fire in the mid-afternoon, to attract a fire tower or forestry personnel. If no one is aware of your plight, you may have to light three signal fires in a triangular pattern or mark an "X" which means "I am not able to proceed." near your signal fire or camp, otherwise your signal fire can be mistaken for a large campfire.

From **Woodstravel Guide** by Mors Kochanski

Using a Mirror

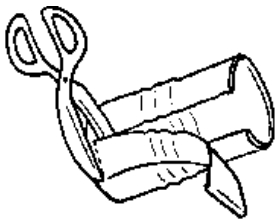
Use the sun and a reflector to flash light signals. Any shiny object will work. Polish a lid from a tin can, use glasses, or a piece of aluminum foil, a mirror is best. Long flashes can mean dashes and short flashes mean dots in Morse code, SOS, _ _ _ • • • _ _ _. Random flashes will also work. A flash can be seen from a great distance. Even if there is no specific contact to aim at, the flash may attract someone's attention. It's worth sweeping the horizon during the day. If a plane approaches closely, make intermittent flashes and when you are certain that you have been seen stop signalling, you may be dazzling the pilot with flashes.

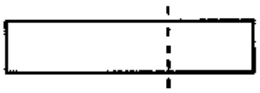
Using a Heliograph

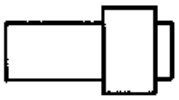
A heliograph is a double-sided reflector with a hole through it. Sight the plane (or what you want to contact, a ship or person) through the hole in the heliograph in the general direction of the sun so that the sun will shine through the hole. You will see a spot of light or it will be on your face. Angle the mirror such that the dot of light on your face disappear back through the hole in the mirror while still sighting your contact.

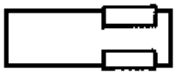
If the sun is at an angle where this maneuver does not work, bring the mirror close to your eyes and line up you hand between the contact and you. Angle the mirror so you flash your hand and then move the hand away.

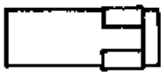
Note:
Do not practice this signal at an actual aircraft unless you are in trouble.

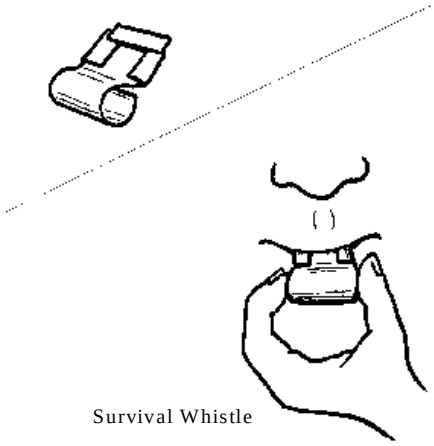












Survival Whistle

Make a Survival Whistle

1. Cut a 2 cm wide strip from an aluminum or tin can about 9 cm long.
2. Flatten the strip and cut it into 2 pieces: 3 cm long and 6 cm long.
3. Form a cross with the strips with 0.5 cm extended over the top. Be careful of the sharp edges.
4. Fold the ends of the shorter strip to the back. Not too tightly, there needs to be a space to whistle through. Fold the top 0.5 cm part over to the back.
5. Use a twig or your finger and curl the long end around the circumference. Now you have a curled end that does not quite meet the folded section.
6. Place your thumb and index finger at each open side of the curl to form the barrel of the whistle. Place the folded part in your mouth and blow over the curls opening.

Dealing With Boredom - Use your imagination and improvise.

- Dismiss worry and focus your energy on the things that count: a good fire, a good shelter, a good bed and lots of drinking water.
- Keep your mind busy and plan for survival. Recognizing the signs of fear and panic will help you overcome their devastating effect. Develop a plan for the next few days. This will raise your morale.
- Make sure that your doorway faces east towards the rising sun. Get up as soon as it is light and get busy.
- Improvise to improve the situation. This will give you more control and raise your morale.
- Remember you goal is to get out alive. Raising your morale by dreaming of the time after you get out alive. This will help you value your life now.
- Conserve you health and strength. Illness or injury will greatly reduce your chance of survival.
- Hunger, cold and fatigue lower your efficiency and stamina and will make you careless. You will realize that your low spirits are the result of your physical condition and not danger.
- Improvising to survive may include eating insects and other unusual foods.

X. SEARCH AND RESCUE

From searching for a lost article to participating in a search and rescue simulation, wardens learn an invaluable skill.

date completed	✓		
_____	☐	Conduct a mock preliminary search for a person lost at camp.	page 153
_____	☐	Conduct a mock secondary search using the containment and confinement methods.	page 159

X. Search and Rescue

The following search and rescue information is used with permission from Skip Stoffel at the Emergency Response Institute, Inc., in Olympia, Washington with the following advisory.

Attention JFW Leaders Teaching Search and Rescue (SAR)

Please be aware that the knowledge and skill level of Junior Forest Wardens in SAR is limited. Becoming aware and learning some SAR techniques should by no means give them the skills to conduct an actual SAR, it may in fact, give them false confidence that SAR is within their abilities. This information is included to provide insight into the scope of knowledge and skills required for effective SAR as well as provide some real incentive for Wardens to always take precautions to stay found.

1. Conduct a mock preliminary search for a lost person at camp.

Background

When you make camp, have Wardens look around and make careful mental notes (or write them down) of their home base. Search for landmarks to identify your location. This habitual precaution will make Wardens more aware of their surroundings and better equipped to stay found..

Awareness of search procedures may show Wardens how important it is to register a route plans.

If Someone Gets Lost

Before embarking on a trip, review the following procedures should any of the Wardens get lost.

- Don't Panic. Stay calm. Attitude is the most important factor in reducing the accident potential.
- Stay where you are. Sooner or later someone in the group will realize that you are missing and they will begin search procedures.
- Look and listen for signals from rescuers and be prepared to make your signal. Remember, three of anything (whistles, shouts, flashes from a flashlight) means help.
- If you have to move because of lightning, rockfalls or avalanche, don't go very far. Leave a note indicating where you went.
- Take stock of your resources such as water, food and equipment.

- Conserve your body heat and energy. Be careful of hypothermia. Put on all your layers of clothes before you begin to get cold.
- When it gets dark, sit down and rest. Build a safe fire which will keep you warm and also be a signal for rescuers.

Precautions

Taking precautions before and during the trip will cut down on the chances of anyone getting lost. Have a group discussion before departing.

1. Be prepared for the possibility of losing a member of the group. Make a list of the equipment required to conduct a search.
2. Survey the trip area carefully. Make group members familiar with its features.
3. Keep a log of the groups activity. Record information on destination, estimated time of arrival, weather patterns and so on.
4. Consult local authorities to determine if there are restrictions in the area you are visiting. For example, river fluctuations due to dam flooding. Advise authorities of your intentions, trip route and length.
5. Allow a margin of safety in calculating traveling time. Consider all the abilities of group members. The slowest members set the group's pace.
6. Take the roll call or a head count frequently. No one should wander from the group.
7. Check all equipment before departing. Advise the group of the possibility of getting lost and your precautions to prevent this happening.

Develop a Search and Rescue Plan

When developing a Search and Rescue Plan, calculate a time-frame for survival. Below are some variables to carefully think about before implementing a search:

- Think about the known behaviour of the lost victim.
- Determine the person's physical condition at the time reported lost.
- Assess the victim's experience and knowledge of the surroundings.

- Consider a possible weather pattern, the difficulty of the terrain, the remaining hours of daylight.

Consider Before Starting

Name - A lost person may be nervous and emotionally upset and may avoid the approach of a rescuer. Call the person's name, it's essential for overcoming the mental block.

Age - Young children stand up to the trials of being lost surprisingly well. Their abilities are generally underestimated by adults, such as the distance they can cover before tiring.

Gender - The difference between females and males makes little difference compared to other more important factors. Generally, females will stand the rigors of being lost better than males.

Physical Fitness - This certainly influences a search, sometimes to the disadvantage of the searchers since the fit person can cover more ground than one who tires quickly. The fit victim, however, has a better chance at survival.

Equipment - Psychologically, an experienced woodsperson will more easily and successfully cope with the difficulties of being lost. She or he will be less gripped by fear of the unknown and be familiar with the technicalities of survival.

Physical Handicap - Any physical handicap will mitigate against the survival of a lost person and may make the search task more difficult.

Terrain - Both searcher and victim will be impeded by rough terrain and thick heavy ground cover. Sounds, sights and movements are reduced and any signs of the victims' travel are almost eliminated.

Training - If any one factor can be said to be the most important, it is probably training. A victim knowing what to do and how to do it will have the best chance of sustaining life, finding the way back or being found.

Carefully search the proposed search area. Where possible, use maps. If there are no maps, identify prominent land features and use them as points of reference in the search. Clearly identify your present location, the proposed search route, the final reconnaissance location and the expected time of arrival. To determine the search area, establish known boundaries, indicate recognizable landmarks identified by searchers, point out the natural barriers that could inhibit the victim's movements, for example, a mountain, a river, a cliff.

Effective communication throughout the search is extremely important. Record all search activity. Throughout the search, establish reconnaissance points and the estimated time of arrival at each. Use a map and watch for orientation throughout the search. Consider the various means of communication and determine which is best suited to your needs. Radio communication is the most effective means but other alternatives such as whistles, flares and shouting can be just as good.

Whistles	**Meaning**
One whistle blast	I'm OK and proceeding
Two whistle blasts	I'm moving to your position, wait for me.
Three whistle blasts	Help!

Coloured Flares	**Meaning**
White flare	I'm OK and proceeding.
Green flare	I'm moving to your position, wait for me.
Red flare	Help!

Search Procedures

Assign someone to be the search leader. The search leader defines search boundaries and sends search members to block-off possible exits or trail-crossings within the search area. This inhibits the victim's movements. Additional searchers should proceed from these exits towards the established reconnaissance point.

While proceeding to reconnaissance point, talking should be kept to a minimum and searchers should stop periodically and call out to the victim using the person's name. The searchers should stop and listen for a possible reply from the victim. Start the search from the last known or assumed location of the victim.

Investigate all visible tracks and follow any noticeable deviations from the normal trails. Investigate natural or hand made shelters (fallen trees, hollow logs, culverts, old cabins, etc.) The victim could be looking for some sort of shelter. Look for clues, for example, candy wrappers, cigarette butts, clothing, etc. and mark the location of clues found using toilet paper, crepe paper, or brightly coloured flagging tape. Plastic markers, however, if left, do not disintegrate if left.

Where possible, use a vehicle to patrol any adjacent roads or trails within the search area. Use a car or ski-do for patrolling. This procedure serves two purposes: the noise could attract a lost person's attention and give them some sense of direction and in case of darkness, the vehicle's lights may be sighted from some distance by the victim. Often a road patrol may pick-up a victim who has wandered out to the road.

On arrival at your final reconnaissance point await reports from all members of the search. Should this initial search prove unsuccessful, formulate plans for a "sweep search" which is a more intricate means of searching and should be coordinated under the direction of a professional search team.

Night Searches

Contrary to popular belief, night-searching usually has a higher rate of success than day-time searching and is based on the following theory:

- Victims are generally immobile at night, therefore, possible contact is easier.
- Moisture content in the air at night allows noise to carry further and also preserves footprints and tracks.
- Generally, a night-time temperature drop and the result usually hardens the snowpack and therefore, permits easier travel on snow.
- In darkness, signaling by any form of light will be viewed from a greater distance than signaling in the daytime.
- Your field of vision using a flashlight carried as a low angle to the ground will minimize the immediate search area and should enhance the discovery of tracks and clues such as cigarette butts or candy wrappers.

While these procedures are intended to advise you on initiating a basic search, precautions taken before and during an outing can prevent the need for these measures.

Activity Ideas

- In a camp setting, have a member of the group get lost. (Choose a person who is confident with their skills as well as good with map and compass. Have them plot a course where they will be. The Warden should take back bearing so he/she knows where the camp is.) Have the group establish a Search and Rescue Plan. Advise them of the procedure as they go through the process of developing the plan.

Conducting a Preliminary Search

When you are together as a group it is important to keep track of everyone. When you discover that someone is missing, take the following steps to conduct a preliminary search:

1. Gather Information

   Establish when the person was last seen, direction headed, and was anything said about where she/he was going. Compare the last time the person was seen to give you an idea of how far the person could have travelled. Estimate the hiking speed of the person and determine how far the person could have walked.

   The point at which the person was last seen and the distance the person could have walked to this time (calculated with rate of walking speed) will be the radius of the circle that will be searched.

2. Make a Quick Check of the Areas Last Seen

   Make a quick visual check in the vicinity of where the person was last seen. Shout the person's name and look around. Make a quick check inside tents if at a base camp.

3. Make a Hasty Search

   When you have no response from shouting, group members may pair up and perform an organized hasty search. A hasty search is a sweep of the area, nearby trails, lookout points, nearby streams or lakes and other obvious places where the person may have gone. Search for 20 to 30 minutes.

Take the time to plan where the searchers should go on the hasty search before sending all the pairs out.

Search Formula

Point Last Seen × Mobile Subject × Time = Search Area

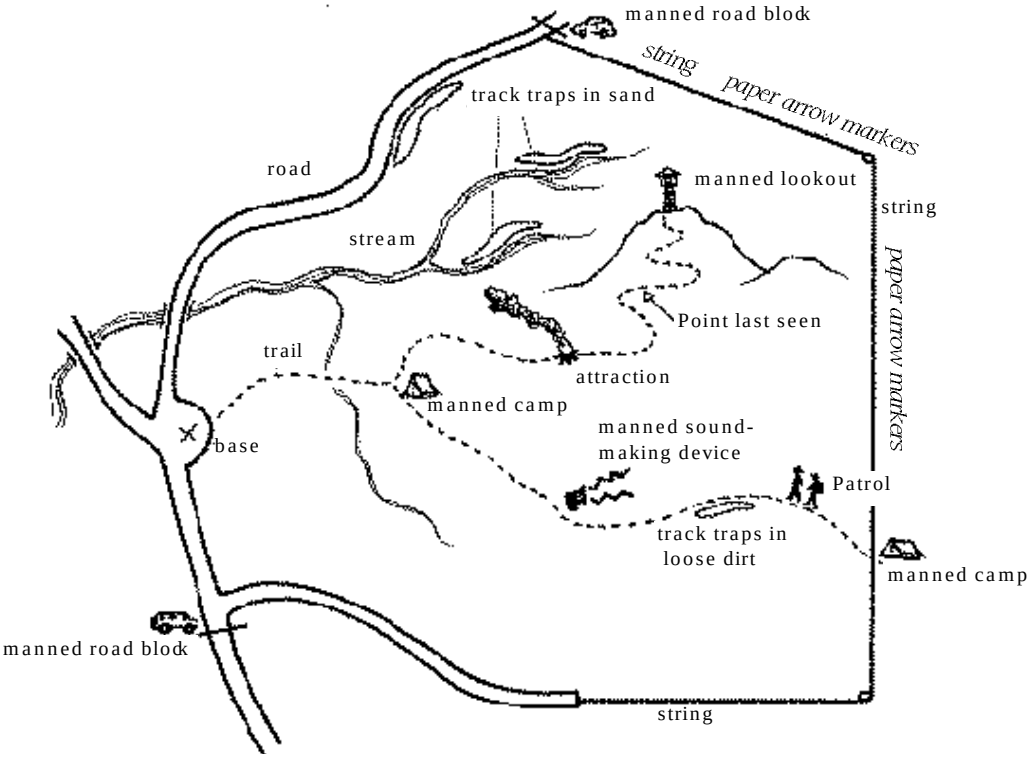
2. Conduct a secondary search using the containment and confinement method.

Background

Confinement allows you to limit the size of the search area. The smaller the area that must be searched, the less time will be required to effectively cover it. It is imperative that an effort be made to establish a search area with specific boundaries beyond which the missing person has not passed.

Confinement

The purpose of confinement is to limit the search area should a clue search fail. A healthy and disoriented victim can keep moving for several days. If no attempt is made to confine his movements, the victim can wander for miles from the last known position. Confinements techniques may not stop the victim, but will detect if and when the person leaves the search area.



Confinement Techniques

- Blocks (road block, trail block, camp-in)

  A search team places itself at a major trail junction, mouth of a canyon, access road or any possible exit from the search area. This will secure any possibility of the victim wandering the wrong way on a trail or hitchhiking home. One person from the team should be alert at all times and never make the assumption that the victim will stop just because he/she sees your camp. That may convince the lost person that the car is just around the next bend. In wilderness areas, trail blocks and camp-ins will preserve perimeter boundaries. A camp-in is setting up camp along a trail or open area.

- Lookouts

  The search team positions itself on anything that will provide a view of most of the search area. If the team has radios, it will report to base which routes it has under surveillance and any gaps in the coverage.

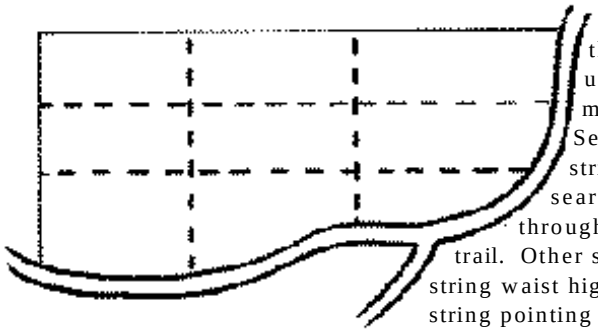
- Track Traps

  A track trap is a band of ground that will easily show tracks. Examples of natural track traps are steep banks of loose dirt, shoulders of dirt roads, broad shallow streams and snow banks. If there are no natural features, you can make a track trap by clearing an area of debris and digging up the surface. The team regularly patrolling the exit routes will be able to tell if the victim has crossed one of the track traps.

- Patrols

  Teams in vehicles can patrol the roads in and around the search area. They can also check track traps.

- String Lines



Where dense brush or timber prohibit the effective use of tracking, string lines are used to create a barrier. This ingenious method was developed by the Explorer Search and Rescue Organization. Spools of string are mounted in a backpack. As the search team member carrying the pack walks through an area, the string unrolls leaving a visible trail. Other search members follow along and tie the string waist high on brush and place paper arrows on the string pointing toward a road or base camp. It is assumed that the victim will follow the arrows or the string.

- Attraction

  Attractions help the victims help themselves to safety. The string line is a form of attraction. Leave a note on the person's car telling them that they are the subject of a search and ask them to check into base camp. Notes can also be placed at trail registers and at shelters. Blocking teams can also keep a campfire going all night to attract the victim.

Line Search

Line search or griding is used when there is no other alternative. The objective of a line search is to locate the victim or clues when other methods have failed. A line search consists of four to 10 searchers. They line and walk abreast through the area to be searched. The spacing between the searchers depends on the terrain and vegetation and on the level of thoroughness desired.

Three spacings are used:

1. **Voice** - searchers maintain voice contact but may not be able to see each other. This is similar to a hasty sweep.
2. **Visual** - Searchers maintain visual contact. This is usually the best compromise between quick coverage and search thoroughness.
3. **Eyeball** - Searchers walk shoulder to shoulder, perhaps crawling on hands and knees. This is a fine-tooth sweep.

All members of a line search should walk at a moderate pace so no one gets ahead or falls behind. Otherwise, gaps develop in the line. The team leader will shout "guide right" or "guide left". "guide right" means the teams members adjust their pace and direction to maintain the proper spacing with the person to their right. If the person to your right speeds up, slows down or veers to the left or right then you must too.

The spacing maintained is average spacing. Rove in your assigned corridor and look closely at bushy areas, logs, piles of rocks and so on. Remember, no one in the search will catch the things you miss. Look around and behind you often. Viewing things from several angles doubles your chances of finding something. Be alert for tracks and other clues.

The search line follows a natural boundary on one end such as a road, a stream, a ridge or a previously marked boundary. At the other end, streamers are tied so they are visible from one to the next. The streamers are marked and tagged with the following information: date, spacing used, team number, and grid number if any.

Search lines should be short with four to six people. Longer lines waste time getting organized and in regrouping. Experimental data and mathematical analysis suggest that multiple sweeps of an area at wide spacing is preferable to a single sweep with tight spacing. Multiple sweeps with wide spacing achieve a greater probability of detection (POD) with much less effort. The probability of early success is higher too. So the best strategy is hasty search that covers lots of area very quickly, then cover it again.

Activity Ideas

- In a camp situation, practice developing confinement methods using a topographical map of the actual area. Discuss the methods that would be effective in that area.

LEADER MANUAL

XI. OUTDOOR EQUIPMENT

Learning the proper use of camping equipment contributes to a safe campout.

✓		
_____	☐ Demonstrate how to light a camp stove.	page 165
_____	☐ Demonstrate how to make a candle lamp or light a lantern.	page 168
_____	☐ On a campout, describe the advantages and disadvantages of using stoves and fires.	page 170
_____	☐ Describe how to select two of the following: daypack, backpack, sleeping bag, tent and canoe paddle.	page 173

XI. Outdoor Equipment

1. Demonstrate how to light a camp stove.

Background

There are two basic types of backpacking stoves, those that use liquid fuel and those that use some form of compressed gas in a canister.

- **Liquid Fuel Stoves** - These stoves burn white gas (Coleman fuel), kerosene or alcohol. The fuel is readily available. Alcohol and kerosene is available worldwide. These stoves require more maintenance and some of these stoves don't simmer well. Alcohol does not burn well over 2,133 metres (7,000 feet)
- **Compressed Gas Stoves** - These stoves burn butane, isobutane or propane. One advantage is that they have an easy on and off and there is low maintenance. But it is difficult to tell how much fuel is left and there is the problem with canister disposal. As well, they do not burn well at high altitude (2,133 metres or 7,000 feet.)

How Stoves Work

To understand how a stove works, it is necessary to know about vapourization. Vapourization is the process whereby liquid becomes gas and mixes with oxygen to become combustible. This process works differently with each fuel type. In gasoline and kerosene stoves, heat is used to expand the liquid fuel inside a vapourization tube. This process pushes the gas through a jet and towards a burner plate. Oxygen is sucked in along the way and the fuel is then ready to light. In the case of liquid petroleum gas stoves, heat isn't required to create vapourization because the gas is already a vapour when it leaves the canister.

Liquid Fuel Stoves

Fuel is stored in a separate tank and in most cases, this tank has a pump to help pressurize the stove. The tank should be filled only to three-quarters, leaving some air in the tank.

Priming the Stove

The pump forces air through a one-way valve into the tank increasing the pressure inside. Opening the fuel flow valve allows the pressurized liquid fuel to flow from the tank through the generator tube, out a small opening called the jet and into the priming cup. Initially, vent only a small amount of fuel into the priming cup and then shut off the fuel flow valve. Priming can also be accomplished by using a separate priming source such as alcohol or priming paste.

Once the generator tube is hot, the fuel flow valve can be opened and the stove burner lit. The pressurized fuel from the tank flows through the heated generator tube where it is vapourized. The fuel that flows through the jet now is gasoline vapour. It strikes the flame spreader and ignites. The flame spreader redirects the flame from a single, vertical "candle" flame to a wider flame for more efficient heating. When the stove is properly primed, a blue flame should be visible.

If the flame is yellow or orange, it means that the fuel is not being completely vapourized in the generator. As the generator heats up further, it may begin to run properly, or the stove may have to be turned off and re-primed.

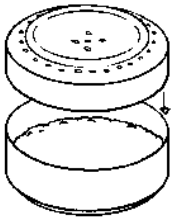
Safety Guidelines

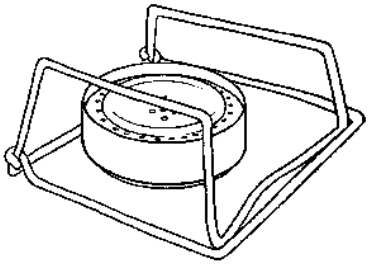
- Know how to operate a stove properly before you light it. Read the stove's operating manual. Conduct a test-run before beginning a trip.
- Ensure that fuel tanks are secure and controls are turned turned off before using. Check for leaks.
- Make sure your stove has enough fuel before you light it.
- Do not overfill.
- Always work from the side of a stove, never put your face or body directly over the burner.
- Take particular care when lighting a stove as flare-ups can occur.
- Make sure the fuel bottle to be used under pressure is in good condition. Dented cans can be used for storage instead of being connected to the stove.
- Do not prime a hot stove. It can result in an instantaneous and violent ignition. Wait for at least 15 minutes.

- Stoves give off carbon monoxide so never use white gas inside a tent, snow cave or any other shelter, it can lead to asphyxiation. Also, tents are flammable.
- Store fuels a safe distance from the stove when lit. Always refill stoves away from flames and heat. Do not open the bottle or stove tank while the stove is in operation.
- Regular maintenance of your stove will help prevent poor performance and possible malfunctions.

Activity Ideas

- Have wardens make a Buddy Burner Stove. For one stove you will need a large coffee can, one small tuna ca, paraffin wax, cardboard, wick material. Use a cleaned, empty tuna can. Cut strips of corrugated cardboard the width that the tuna can is deep. Coil the cardboard strip(s) around a wick. Keep coiling and place snugly but not too tight into the can. Fill with melted paraffin wax. Cut vent holes into the bottom of the coffee can. Place the tuna can filled with wax inside and light. Place the pot of water on the top of the inverted coffee can and wait for the water to boil.
- Have wardens make their own lightweight backpack stove. They are relatively easy to make. See Instructions and illustrations on page 134.





Lightweight Backpack Stove

Materials Required

- 2 aluminum pop cans
- 1⁄4 cup (60 ml) Perlite (found in gardening department)
- wire coat hanger
- de-natured alcohol (found in paint department or boating supplies)

Tools Required

- wire cutters
- scissors
- drill and drill bit 1/16" (2 mm)
- fine sandpaper

Here's How

1 For the base, neatly cut one can approximately 11/2" (3.5 cm) from the bottom. For the top, cut the other can about 1" (2.5 cm) from the bottom.

2. Use the 1/16" drill bit and drill a number of holes, about 18 to 30, around the edge of the top and in the centre as shown.

3. Fill the base with Perlite just over half full.

4. Make six to eight vertical cuts around the top. The cuts should be up to, but not over, the rounded edge. Slowly press the top into the bottom. You can use a small board for pressing down to help make it even.

5. Fill the stove about half full of alcohol. Light the burner slowly by moving a match over the edge of the burner. Note: If it does not stay lit, tip the burner up to leak some fuel into the rim and re-light. Hold it until it stays lit or gets too hot.

6. Cut and straighten a coat hanger. Use a fine sandpaper to remove any paint or coating. Bend the coat hanger into a shape that will hold a pot a few inches above the burner. With a little imagination you can create a number of stove bases. One idea is shown in the illustration.

2. Demonstrate how to make a candle lamp or light a lantern.

Background

Flashlights and batteries are not the only solution in the quest for good outdoor illumination. A variety of other options burn some kind of fuel to produce light. Fuels include various forms of gas and the meeker, ever-reliable candle.

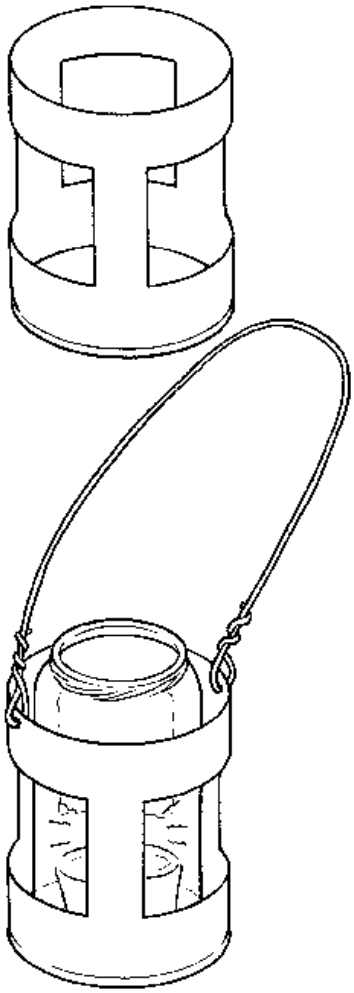
Flashlights

A good flashlight is one of those essential camping items. A flashlight will help you see around the camp when the sun goes down, it is a good safety device that can be used to summon help and as a bonus you will be able to read maps

and novels in the tent. Head lamps, based on the lights on miners' helmets, are the way to go. They allow you to have both hands dexterity and will light in the direction you are looking.

Candle Lamps

Candle lamps are safe outdoors but not inside the tent. The potential for disaster increases when you introduce anything with a flame into your nylon tent. Candle lanterns offer a reasonable amount of light but not for spotlighting a huge area. They are good for general lighting needs, casting a romantic and ecological friendly glow over whatever is around them. Good quality candle lanterns can be purchased. You can easily make one too.



Materials Required

- tin can, cleaned with bottom still on
- glass jar that fits inside tin can
- candles
- large nail
- hammer
- clothes hanger for wire or re-bar wire
- wire cutters
- tin snips
- sand paper (optional)

Here's How

1. Mark three large openings around the can that can be cut out with tin snips. Cut out the windows around the can and sand edges if too sharp and jagged.
2. Use a hammer and nail, and hammer a hole on both sides of the can so the wire can be put through the holes for the handle.
3. Cut the wire length to your preference for a handle. Leave enough to twist around each end.
4. Put the candle on the bottom of the jar and place the jar into the can.
5. Light candle with a long match or a burning twig.
6. Hang from tree branches, leave on picnic table or carry.

Lighting a Lantern

When weight isn't too much of a concern or you are planning to stay at one campsite for a long periods, gas-powered lighting offers bright and reliable light. Much like gas stoves, gas-powered lighting uses white gas or butane or propane canisters. Like their cooking counterparts, gas-fueled lights should never be used inside a tent. Fire and oxygen depletion are real dangers, Use a battery-powered lamp inside the tent.

Always bring extra fuel and an extra mantle. Mantles come in different sizes, bring one that fits your lantern.

Some people find the gas-powered lamps too bright. This is a personal opinion. A bulky gas-powered light is also difficult to handle and aim, these lights are meant to stay put. They are heavy and bulky and reasonably hardy, however, if the glass globe or mantle break and there are no extra supplies, then the lantern will not work.

Follow the manufacturer's instructions for the lantern. They are much the same as stoves with the same fuel. If you have never put on and burned a mantle, practice before you go on a trip.

3. On a campout, describe the advantages and disadvantages of using stoves and fires.

Activity Ideas

- On an outing where your group is using a stove, discuss its advantages and disadvantages.
- On an outing where your group is having a fire, discuss its advantages and disadvantages.

Stoves

Advantages of a Stove

- Hot food or purified water can be ready in minutes, even under the most adverse conditions.
- A stove has no adverse impact on the environment.
- A stove can be used in areas where fire danger is moderate to high, when there are restrictions against fires in certain locations or above certain altitudes, on windy days when sparks from a fire might be dangerous, when dead wood is scarce, and when a fire is used solely for group bonding,

Disadvantages of Stoves

- If you run out of fuel and there's no fire, then no meals or warmth.
- Stoves can flare up and fires can result.
- You have to be familiar and know how to use a stove to be able to use it in adverse conditions.
- If the stoves breaks or stops working, you have to know how to fix it.
- Fuel is highly flammable and must be cared for properly.

Fire

Advantages of a Fire

- Fires can make the difference between living and dying.
- Fire provides warmth which helps your mind stay positive.
- Fire has a strong positive psychological impact upon a person in a survival situation.
- A fire can be made with minimum equipment (one match) and dead fall in survival situations.
- A fire helps to cook meals and use many edible plants that would otherwise be difficult to prepare.
- A fire's size can be changed from small (for cooking) to large (for warming up) as needed in very little time.
- A fire can keep animals at bay and make you feel protected from predators.
- A smoky fire can keep away insects.

- A fire can dry clothes and prevent hypothermia.
- Fire can be used to burn trunks or large sticks so that they are more manageable to be used for construction of a shelter.
- Smoke can be used to smoke out wild bees to get their honey.
- Fire can be used to send smoke signals and signal fires.
- A fire can heat metal, shape tools, sharpen sticks and bake pots.
- Water can be boiled for purification.
- If there is an established fire ring, you can have a leave no trace fire.
- If your stove is not working, have a fire.

Disadvantages of Fire

- If the weather is too windy or a torrential down pour, a fire will not stay lit.
- A fire placed in the wrong location and during a dry spell may cause a forest fire and potential death.
- A campfire poses a danger to people when burns occur.
- When the fire danger is moderate to high, a fire must be avoided.
- Fires are prohibited in certain locations or above certain altitudes.
- Even the best no impact fires leave an impact on the land.
- Using fuel for a fire has an impact on the environment. Especially if there is little to no dead fall.

What else can you add?

4. Describe how to select two of the following: daypack, backpack, sleeping bag, tent and canoe paddle.

Daypack

A day pack is great for short, low capacity outings such as day hikes, photography or bird watching excursions. Their capacity is relatively small, 15 to 35 litres, the weight of a loaded daypack can easily be carried on the shoulders. A daypack should have a waist strap for stability and extra padding along the back for extra comfort.

Alpine packs have a larger capacity, 30 to 55 litres compared to daypacks, making them useful for equipment intensive activities such as cross country ski touring, climbing or even overnight trips. Most alpine packs use a weight-bearing hip belt because of the additional load that may be carried. Foam or plastic panels are often used to provide extra support and rigidity although some high-end alpine packs may have internal frames and suspension systems.

Backpack

Backpacking packs are also called expedition packs and have a capacity 70 to 100 litres. These packs are necessary for long trips. The large capacity in these packs requires that they have a frame to provide the structural rigidity needed to transfer the weight of the load from the back and the shoulders to the hips.

Backpacks have three distinct components: frame, packbag and suspension.

Frame

1. **External Frame** - the ladder-like frame is the heart of the system. Constructed of seamless, aircraft quality aluminum alloy or high-tech composites, the frame is rigid enough to distribute most of the weight to the hips where 80 percent of the load should be carried. External frame packs carry the load high, putting the centre of gravity over the hips. On uneven trails, this pack sways and can cause havoc with balance.
2. **Internal Frame** - An internal frame is not as stiff as an external frame allowing the pack to flex and move with the

body. Integrating a frame into the pack allows the pack to be worn closer to the body. There is less ventilation but it keeps the centre of gravity lower and closer to the body.

Packbag

The packbag is where the bulk of the materials will be packed. Zippers, side bags, and places where webbing can be attached are all good features. Evaluate the pack for keeping things dry. Will rain seep through the zipper? Is the zipper sturdy and made of nylon?

Suspension

A pack's suspension system is made up of a hip belt, shoulder straps and some form of back support. When properly adjusted, up to 80 % of the load weight should be on the hips making the hip belt a critical part of the system.

Sleeping Bag

Buying a sleeping bag is not a simple process. Consider the kind of fill, comfort rating, shape and construction and weight and compatibility. First, consider the conditions you expect to encounter. Sleeping bags have four comfort ratings:

- summer weight (above freezing)
- 3-season (as low as -10°C)
- 4-season (15° to -20° C)
- winter/extreme (as low as -40°C)

The fill in a sleeping bag creates thousands of small dead air pockets. These pockets trap warmth generated by your body.

Down is an excellent insulator and nothing beats the warmth to weight ratio, compressibility or luxurious feel of a good down bag. The quality of down is measured by fill power, for example one ounce of 550 fill has a volume of 550 cubic inches when fully lofted. The major drawback with down is that it loses most of its insulating power when wet and air drying takes a long time.

Synthetic fills are made of small diameter polymer fibres. Quality bags will contain respected brand names such as Hollofil II, Polarguard HV (high void) or Lite Loft. A synthetic bag is less expensive than down, but not as light or as compressible. A synthetic bag will dry quickly and will still keep some of its lofting and warmth when wet.

The **outer shell** of the sleeping bag must serve three critical functions: Hold insulation in place, create an effective wind

block and allow internal moisture from perspiration to escape. Ripstop or taffeta nylon are frequently used because of their light weight and tight weave. For comfort, the inner lining must be soft, breathable and be able to wick moisture away from your body. To prevent the outer shell and inner lining of the bag from touching which can be a potential cold spot, sheets or batts of fill should be overlapped so that each stitch is backed up by one or more layers of insulation. In a down bag, baffles are constructed to keep the loose fill in place. The baffles are like channels filled with down made by sewing mesh fabric to the shell and the lining.

There are four basic bag shapes: mummy, modified mummy, barrel and rectangular. A close fitting bag will have a higher thermal efficiency than a roomier one even if they have the same amount of loft.

Features of a Sleeping Bag

- **Hoods** - should be contoured with lots of insulation.
- **Yokes** - keep warm air from being forced out around your neck whenever there is movement in the bag.
- **Foot boxes** - should allow room for your feet to rest naturally without compressing insulation. There should be extra insulation here.
- **Draft tubes** - should run the entire length of the zipper to prevent cold spots. It is best when they are sewn to the inner lining and to the outer shell.
- **Zipper** - should be made of nylon and be light, easy running. Nylon coil zippers are less likely to snag fabric and conduct less heat than a metal zipper.

Tent

See page 62-3 for a description of tent features.

Canoe Paddle

A good paddle is essential for obtaining the best performance from a boat. Paddles come in a wide variety of designs to suit different types of water and travel, for example, whitewater and flatwater touring

Construction

- One-piece wood paddle - the oldest type of paddle design. They are flexible and light. The most common wood types used are: (from the heaviest to the lightest) maple, ash, cherry, basswood, spruce and butternut.
- Laminated wood paddles - made from strip of wood laminated together. They are usually wider than a one-piece wood paddle. They tend to be stiff which allows them to transfer power better.
- Synthetic paddles - made from a variety of materials: kevlar, fibreglass, aluminum and plastic. They vary in quality and performance.

Shape

Paddle blades come in a variety of shapes. The most common canoe paddle is dihedral. A dihedral blade has a bulge in the centre tapering to thinner edges designed to reduce turbulence. Good for flatwater paddling.

Discounts

Junior Forest Wardens are able to obtain discounts at most sporting good stores. Be sure to ask for one.

Width and Length

A wide blade provides more propulsion and leverage but also more muscle power than a narrower blade. A narrow blade does not have much resistance and a paddler may have more stokers per kilometer of travel than a wider one. Paddle length is important too. A long paddle gives more leverage but a heavier one has a greater recovery arc.

The Shaft

The ultimate paddle shaft should be strong, light and comfortable. There should also be some flexibility and this depends on personal taste. Flexible shafted paddles are good for long trips. The shaft should also fit a person's hands and body length. Boat size, paddling style and body type are also factors when choosing a paddle.

There are four broad groups of paddles: traditional, recreational, bent-shaft and whitewater. The traditional paddle has a long narrow blade that performs well in deep water touring. Traditional designs include the beavertail and ottertail. Recreational paddles are typically square shaped. These are multi-functional paddles that work well in a variety of conditions. Bent-shaft paddles provide optimum propulsion The angled blade maximizes the amount of time the paddle spends perpendicular to the surface of the water. Whitewater paddles usually have a larger blade for maximum power. These paddles are stiff and strong, designed to be durable and powerful.

XII. DAYTRIPS AND CAMPOUTS

Through participating, planning and leading a variety of daytrips and campouts, wardens have the opportunity to practice the skills they have learned in real-life situations.

✓		
_____	☐ Participate in nine daytrips.	page 179
_____	☐ Participate in six campouts.	page 180
_____	☐ Demonstrate an intermediate level of skill in two and a beginner level in one of the following: hiking, canoeing, cross-country skiing, or snowshoeing.	page 181

XII. Daytrips and Campouts

1. Participate in nine daytrips.

Background

A daytrip in an excursion which consists of several hours (5 to 8 hours) of an activity which covers distance (skiing, snowshoeing, hiking, canoeing) with at least a snack and a meal planned and prepared by the Wardens. A daytrip can be a day's activity in a campout situation. For example, Wardens may do a hike from a base camp for a day and return to base camp to spend the night.

List the nine daytrips below. On a separate sheet of paper describe the trip, who attended, the route taken, a map and so on.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9, _____

2. Participate in six campouts.

Background

A campout is an overnight excursion in a tent, hand-made or constructed shelter for one or more nights with at least three meals (supper, breakfast, lunch, and snacks) planned and prepared by the Wardens. Campouts may include a daytrip where Wardens do a daytrip from a base camp, for example in canoeing, hiking or snowshoeing and return to camp.

List the six campouts below. On a separate sheet of paper, include who was on the trip, who was the leader, date, duration, weather, food menus, activities done, and so on. Include a photocopy of a map with areas visited marked.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

3. Demonstrate an intermediate level of skill in two of the following and a beginner level in one of the following: hiking, canoeing, cross-country skiing, or snowshoeing.

Refer to the Appendices section in this program for information on each skill.

It should be noted that there are provincial associations for canoeing and cross country skiing (but not for hiking or snowshoeing) which Warden leaders may contact to receive their own training or to possibly employ an instructor to teach your group. Contact information is located in the Phone Book Yellow Pages section of this program.

Interpretation

To assist leaders with an understanding of what constitutes the two skill levels, a summary is below:

Beginner Level

- a new learner, novice or apprentice
- demonstrates no prior experience or a brief introduction
- knowledge and skill level is nil to brief introductory level
- person is an apprentice in learning
- over time the person will demonstrate improvement in skill and knowledge levels and will then move onto intermediate level.

Intermediate Level

- shows independence in preparation of equipment, demonstrates proper care of equipment,
- demonstrates some proficiency in the basic skills and the development of advanced skills
- average skill level, halfway between initial skill level to advanced and expert class.

Hiking

Trip Planning

Planning for a trip is important because it can prepare a group for leaving no trace, it will ensure the safety of the group and individuals, it contributes to accomplishing trip goals, and it increases self-confidence and opportunities for learning.

Consider the following when planning a trip:

- What are the expectations (goals) of the trip?
- Identify the skills and abilities of the group.
- Select a destination to match goals, skills and abilities.
- Get information on the area you plan to visit.
- Choose proper equipment and clothing.
- Plan trip activities to match goals, skills and abilities.
- Evaluate your trip and make a note of any changes recommended.

Activity **Pack a Pack**

Summary

Have Wardens pack a backpack and evaluate the contents at a club meeting.

Material Required

- picture of a destination site for a day hike

Procedure

1. Explain to the group that they are going on an imaginary day hike. Build suspense by asking Wardens to guess the destination.
2. Show the destination pictures and describe the location you have selected. Describe the terrain, weather, things to see.
3. Explain the goal of the day hike. (fish, view wildlife)
4. Ask the Wardens to pack a pack and bring for next meeting.

Next Meeting

1. Ask the Wardens to unpack their packs. Discuss the following questions:
   - ❍ Do the contents ensure your safety?

     Check for proper clothing, maps, compass, small flashlight, water filter, first aid kit . .
   - ❍ Do the contents ensure you will leave no trace and not damage natural resources?

     Check for stove, repackaged food, cathole trowel, no hatchet, plastic jug for water . . .
   - ❍ Do the contents ensure your trip will meet your goal, for example, wildlife viewing, fish safely and enjoyably?

     Check for binoculars, camera, bird book, fishing gear, fishing license . . .
2. Because the Wardens packed their packs without proper information, it is unlikely they will be adequately prepared.
3. This activity demonstrate the importance of planning. Discuss the results and then play the short matching game, Will You Make It?, page 148.

Discussion

- ❍ How would the contents of your pack differ with different destinations?
- ❍ What other information do you need to pack properly for a trip?
- ❍ What is the value of knowing pieces of information before packing?

A c t i v i t y **Game - Will You Make It?**

Summary

Wardens will explore some real life scenarios to help them see the importance of good preparation for a successful trip.

Materials Required

- 8 Travel cards
- 8 Solution Cards
- 16 Wardens

Procedure

1. Make a copy of page 186, Travel Cards and page 187, Solution Cards. Cut apart the cards for a total of 16 cards.
2. Randomly give one card to each Warden. If you have less than 16 Wardens, adjust the number of cards given out. Make sure that all Travel Card being used have Solution Cards to match.
3. Have the Wardens mingle to match the cards, the travel event to its solution.
4. Once the cards are matched, have the pairs plan some way to teach this plan ahead concept. Allow group members to be as imaginative as they like. Perhaps pantomime, acting out, lecture, drawing.
5. Give a presentation. Have each pair teach their concept to the rest of the group using the presentation method they have prepared.
6. Discuss every scenario. Emphasize the key concepts to trip planning. What other scenarios may have been used?

Answers:

Travel Card # 12 Blisters! - 1, Travel Card # 2 Lightning! - 9, Travel Card # 15 Pack Weight! - 3, Travel Card # 4 Steep Trail! - 11, Travel Card #14 Private Property! - 5, Travel Card #6 Water! - 13, Travel Card #10 Campfire Ban! - 7, Travel Card #8 Campsite! - 16.

Summary Discussions

Your group has participated in two activities, one identifies reasons for trip planning, the other identifies key elements to consider when planning a trip. Create a Planning and Preparation Checklist that you can use to plan your next trip. Use the groups discussions to create a checklist.

- Identify at least three reasons why trip planning is important?

- Describe seven key elements included in successful planning and preparation.
- Do the planning elements change depending on the environment visited? For example, high alpine versus grassland?
- Recall safety concerns Wardens have experienced or witnessed as a result of poor planning.

Additional Activities

- Create new Travel Cards and solutions as the Wardens learn new and more leave no trace concepts.
- Share the planning process with your family and use it to plan a family vacation or gathering.

8 Travel Cards

Copy on a blank piece of paper and cut apart.

Travel Card #12 BLISTERS! You have a nasty blister and can no longer carry your pack. You are not sure you can even walk to your campsite.	Travel Card #2 LIGHTNING! A storm is quickly blowing into your area. From your vantage point on the trail you can see lots of lightning. You estimate you have about five minutes before the storm reaches you.	Travel Card #15 PACK WEIGHT! Your pack did not feel heavy when you left, but now you can hardly move. You're so tired you would just as soon sit right down and not walk another step!	Travel Card #4 STEEP TRAIL! Your hike is 5 km long and gains 300 metres for every km. You must reach camp before dark. Everyone is walking very slowly because it is so steep.
Travel Card #14 PRIVATE PROPERTY! Your group is walking along a trail when suddenly in front of you there is a "No Trespassing" sign.	Travel Card #6 WATER! Your group brought two litres of water per person, but your hike has been very hot and now everyone is low on water. You can't boil water to drink because there is a fire ban in effect and you don't have a stove because you were only going on a hike.	Travel Card #10 CAMPFIRE BAN! You have no stove and the area you came to visit has been heavily used and does not permit campfires. It's dinner time and everyone in the group is very hungry.	Travel Card #8 CAMPSITE! When you arrive at your destination you find both of the campsites recommended to you by friends are being used. It will be dark soon and there is little time to search for another site. You are tempted to set up camp right on the trail, even though you know that does not follow good backcountry ethics.

8 Solution Cards

Copy on a blank piece of paper and cut apart.

Solution Card #1 An adhesive felt-like material acts like a second skin and can be applied to the feet or other areas of human skin to prevent rubbing. Always carry this with you and break in new footwear before a trip.	Solution Card #9 Before you left on your trip, you researched safety. You remember that lightning is attracted to the highest point and that water and metal conduct the electrical charge. You take off your metal frame pack, stay away from puddles of water and choose a low spot in which to crouch away from the tallest trees.	Travel Card #3 Too bad. Your heavy pack made it impossible for you to hike fast. You find a campsite for the night, but you never made it to your destination. The weight of your pack should generally be no more than your body weight. Pack your backpack before you leave and weigh it on a scale. Leave items behind if necessary. Some things, like cook kits, may be shared by several people and the contents divided among several packs.	Solution Card #11 You believe in planning ahead. You looked at a map and talked to the agency that manages this trail, so you were aware it was steep. Realizing that people make an average of 3.2 km/h on that terrain, you figured flat terrain hiking time of 1 to 1 1/2 hours for the 5 km trail and doubled it to account for the steep elevation gain. You set out early in the morning and have plenty of time to reach camp before dark.
Solution Card #15 Your group leader pulls out a statement signed by the owner of the private property who posted "No Trespassing" giving the group permission to cross the private property. A review of maps revealed this private property, and a couple of phone calls resulted in the signed statement.	Solution Card #13 After another hour of an uncomfortably dry hike, you run across a prepared hiker who pulls out a water filter designed to remove bacteria from wild water sources. After taking a break on the rocky shore of a small pond and filtering water, you have enough water to finish the hike.	Solution Card #7 Because this was only an overnight camping trip, someone suggested you bring prepared food for dinner. As the sun begins to set, everyone gathers together on a rock outcrop near camp and pulls out a sandwich, piece of fruit, and a snack for dessert. As darkness falls the group watches the stars appear and tells stories about shadows in the night.	Solution Card #16 Your group leader hiked to this area two weeks ago in anticipation of your trip and found three perfect campsite options. After following your leader for another 10 minutes you move off trail to a campsite with big flat rocks to sit on and a great view of the canyon.

Silver Tree Adventurers - Woodstravel Framework

First Aid

1. Complete a St. John's Ambulance or Red Cross emergency first aid course.
2. Demonstrate how to manage an accident and how to get help.
3. Construct and demonstrate how to use a first aid kit.

Fire Lighting Techniques

1. Explain the needs of a fire while building a fire.
2. Prepare a three-course meal over an open fire.
3. Build and maintain a warming fire.
4. Build, use and put out a no trace cooking fire.
5. Demonstrate how to make three types of fires, at least one in winter or during wet, windy conditions.

Outdoor Clothing

1. Demonstrate how to use outdoor clothing to manage thermoregulation.
2. Describe three types of clothing fabrics and the qualities of each.
3. Give a 10-minute outdoor clothing lecture at school or to a Pathfinder group.

Shelter

1. Construct and use a lean-to.
2. Construct and use three types of snow shelters and/or shelters from natural products combined with plastic and nylon.
3. Demonstrate two techniques for low-impact emergency shelters for use in natural areas.

4. Demonstrate the proper location of shelters, considering survival and natural hazards.
5. Explain qualities and desirable features of tents.

Navigation

1. Identify the features on topographical maps and plot a course.
2. Demonstrate orienting a map to the terrain.
3. Demonstrate orienting a map with a compass.
4. Demonstrate techniques for setting a bearing and proper pacing.
5. Demonstrate the use of a map and a compass on a trip in order to prove proficiency in staying found.

Outdoor safety

1. Demonstrate how to cope with two of the following in a camping and survival situation: sunburn, frostbite, hypothermia, dehydration, and wildlife problems.
2. Describe emergency techniques to acquire water during a simulated survival situation.
3. Describe six natural indicators of a storm and demonstrate the actions that should be taken.

Responsible Hiking and Camping

1. Demonstrate food packaging techniques for a weekend campout. Describe how the packaging considers spoilage, food preservation and protection from wildlife.
2. Develop a cost-effective menu (not freeze-dried items) for a group of six for a week-long ski or backpack trip.
3. Discuss the philosophy of leave no trace camping and demonstrate leave no trace camping in the following skill and knowledge areas: food preparation and cooking, fire building and fuel selection, shelter, and waste disposal.
4. List ways you are responsible to and for others while planning a trip, during a trip and after a trip.

Knots and Lashings

1. Make a shelter or an outdoor tool using cords and demonstrate the proper use of three knots and two lashings.
2. Construct a knot display board which includes the name and use for at least eight knots.
3. Make cordage out of natural materials.

Survival

1. Describe factors affecting survival.
2. Describe the priorities of survival.
3. Practice a pattern for staying alive for one full day. Demonstrate proficiency in the use of map and compass, shelter, fire, finding water, natural navigation aids, emergency first aid, signals, and dealing with boredom.

Search and Rescue

1. Conduct a preliminary search for a person lost at camp.
2. Conduct a secondary search using the containment and confinement methods.

Outdoor Equipment

1. Demonstrate how to light a camp stove.
2. Demonstrate how to light a lantern.
3. On a campout, describe the advantages and disadvantages of using stoves and fires.
4. Describe how to select two of the following: daypack, backpack, sleeping bag and tent.

Daytrips and Campouts

1. Participate in nine daytrips.
2. Participate in six campouts.
3. Demonstrate an intermediate level of skill in two of the following and a beginner level in one of the following: hiking, canoeing, cross-country skiing, or snowshoeing.

APPENDIX

Wind Chill

APPENDIX

Windchill Factors at Different Temperatures and Wind Speeds

Temperatures in Still Air

KPH	0°C	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C	-35°C	-40°C	-45°C	-50°C
8	-2°C	-7°C	-12°C	-17°C	-23°C	-28°C	-33°C	-38°C	-44°C	-49°C	-54°C
16	-8°C	-14°C	-20°C	-26°C	-32°C	-38°C	-44°C	-51°C	-57°C	-63°C	-69°C
24	-11°C	-18°C	-25°C	-32°C	-38°C	-45°C	-52°C	-58°C	65°C	-72°C	-78°C
32	-13°C	-21°C	-28°C	-36°C	-42°C	-49°C	-57°C	-64°C	-71°C	-78°C	-85°C
40	-16°C	-23°C	-31°C	-38°C	-46°C	-53°C	-61°C	-68°C	-76°C	-83°C	-90°C
48	-17°C	-25°C	-33°C	-41°C	-48°C	-56°C	-63°C	-72°C	-78°C	-86°C	-94°C
56	-18°C	-26°C	-34°C	-42°C	-49°C	-57°C	-65°C	-73°C	-81°C	-88°C	-97°C
64	-19°C	-27°C	-35°C	-43°C	51°C–	-59°C	-66°C	-74°C	–82°C	-91°C	-98°C
72	-19°C	-28°C	-36°C	-43°C	52°C	-59°C	-67°C	-75°C	-83°C	-91°C	-99°C
80	-20°C	-28°C	-36°C	-44°C	-57°C	-60°C	-68°C	-76°C	-84°C	-92°C	-100°C

Wind Speed

Little Danger

(If properly dressed)

Considerable Danger

(Exposed flesh may freeze within one minute)

Very Great Danger

(Exposed flesh may freeze within 30 seconds)

Wind Speeds greater than 40 kph have little additional effect

Last revised: 12/00

APPENDIX

II

Knots, Lashings & Splices

Adventurers
JUNIOR FOREST WARDENS

APPENDIX

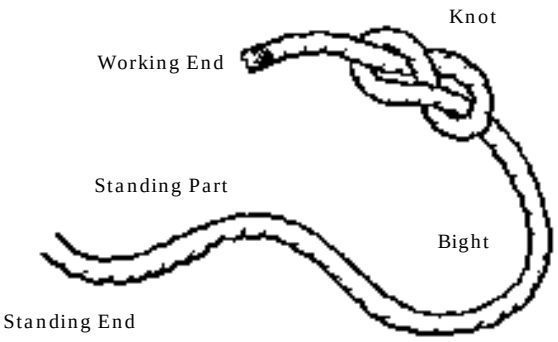
Knots

There is a knot for every job and it is important to select the right one for the job at hand. You never know when you will need to tie a knot so learn their uses and how to tie each one in the dark, behind you back and under all kinds of conditions.

Tom Brown Jr. In his book entitled, Tom Brown's Field Guide To Wilderness Survival, suggests that you only need to know three knots: knots to join two pieces of cordage, knots to attach cordage to another objects and knots to ensure lashings.

Below are some terms used in knots:

- Running end - the end of the rope that is the free end, commonly called the end.
- Standing part - the fastened part of the rope, may also be called the line or the rope.
- Bight - a simple turn that does not cross itself.
- Loop - a turn that does cross itself.
- Half-hitch - a loop that runs around a shaft or another piece of rope so that it locks itself.



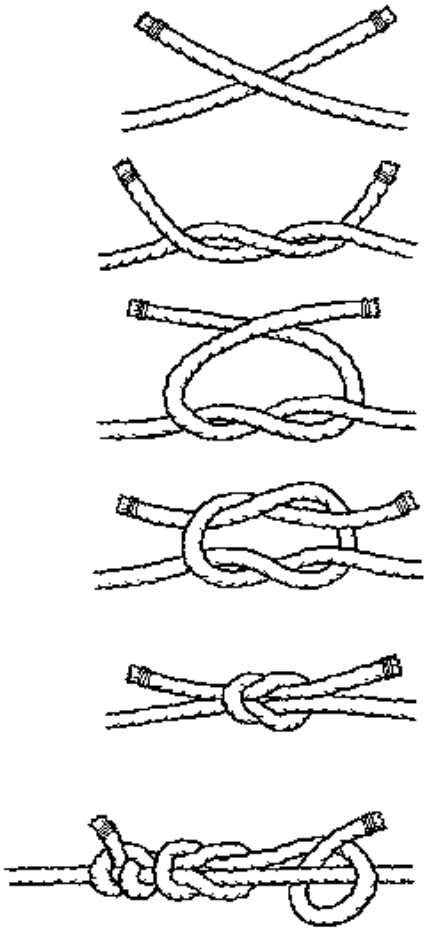
Simple Knots

Reef Knot

Also known as the square knot. This is the best known of all knots. It is used for tying rope of the same thickness and will hold firm even under strain, yet is easily untied. This is not a good knot if the ropes are of different diameters and if used with nylon will slip. It is a good first aid knot and will lie flat against the victim.

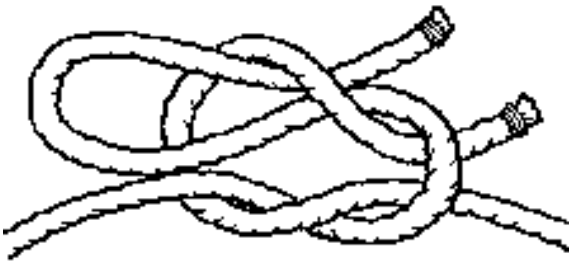
Pass the right end over the left and then under. Then take the left over the right and under. The two loops should slide over each other. (If they are tied the wrong way, you have a granny knot which may not hold and is hard to untie.) Remember: "Right over left, left over right."

Tighten by pulling both the strands on each side or just the live ends, but be sure to tigl properly. To be doubly off the knot by making the live ends on both si knot.



Slippery Reef Knot

This knot is tied the same way as a reef knot but before pulling it tight, slip one of the ends back through the bight. By pulling on this end the knot can be untied easily and quickly.



Surgeon's Knot

This is another variation of the reef knot. The difference is by having the left end taken around the right end twice instead of once on the first crossing. The double first crossing gives it enough friction to hold until the second end is tied.

Overhand Loop

This is the easiest of all knots. Make a loop and pass the live end back through it. It has very little purpose on its own except to make a stop at the end of a rope. It is, however, a part of many other knots.

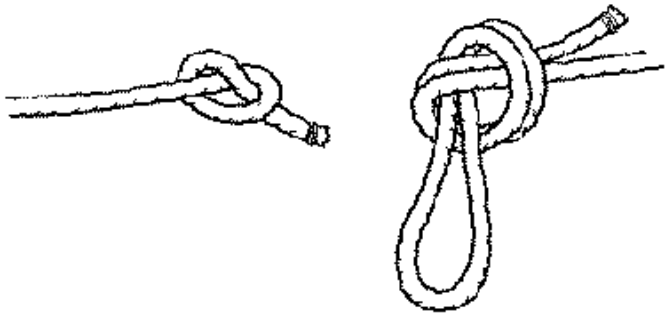


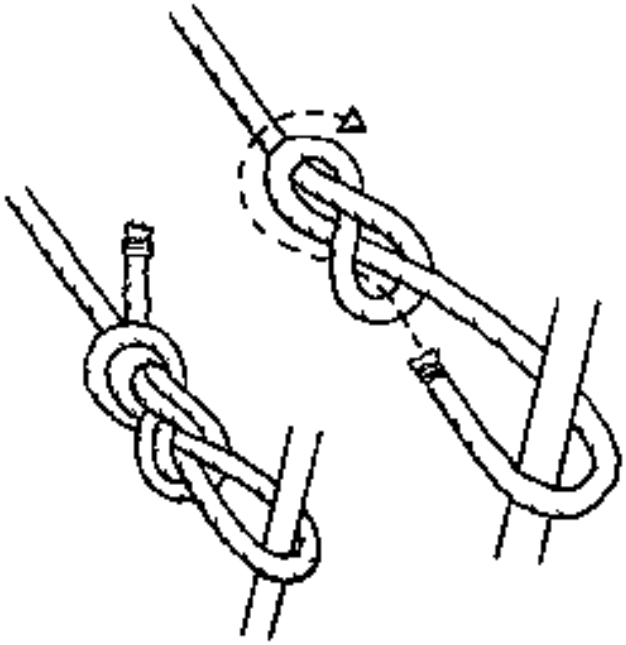
Figure-of-eight

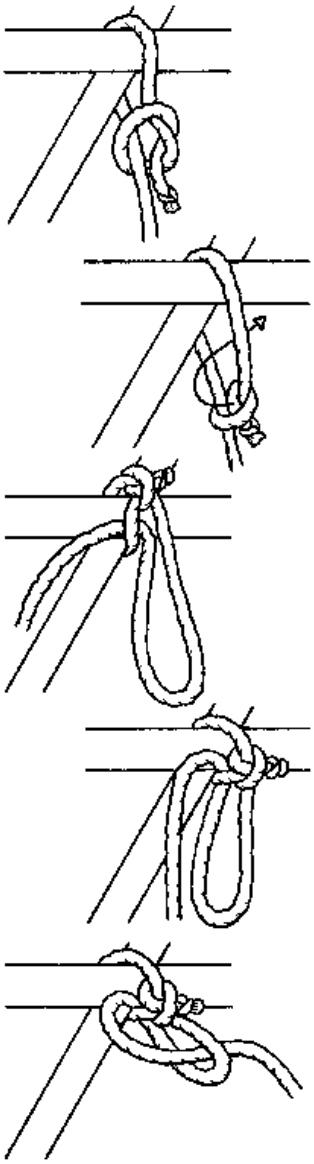
This is a good stopper knot, will not allow a rope to slip through a hole or out of a pulley. This makes a much more effective end-stop than an overhand knot. Note that when snuggled, the end of the rope projects at a right angle to the standing part.

Make a loop. Carry the live end first behind, then around, the standing part. Bring it forward through the loop.

Figure-of-eight Loop

More secure than the overhand loop, this is made in the same way as the figure-of-eight, but with the line doubles, using the loop as the live end. It can be used over a spike anchor for a belaying rope.





Jam Knot

The jam knot is used to lash or tie anything together very tightly. The Roycraft emergency snowshoe requires as few as 18 to as many as 42 jam knots to lash a pair together. The lash can be very tight if nylon cord is used, if the slight elasticity of nylon is utilized.

Tie an overhand knot about one cm from the end of the lash cord. Pass the cord around the object to be lashed and tie another overhand knot to end up against the first knot with the short end pointing down the long part of the cord.

Before the knot is pulled too tight, invert the knot in order to form the loop to be used later in locking the knot. Draw the knot up snug with a firm pull, with the knot being positioned about one cm from where it is to end up. Using the Parbuckle technique, a crushing lash can be made if the lash cord is strong enough.

Firmly hold the objects being tighten up, the knot may move some distance as the elasticity of the cord is taken up. The knot is locked by passing the end through the loop and pulling the loop closed.

If a single lash is used, the ends may be left about long enough, about one cm, to melt together. Nylon cord has a bad reputation for untying on its own which is prevented by melting the ends together.

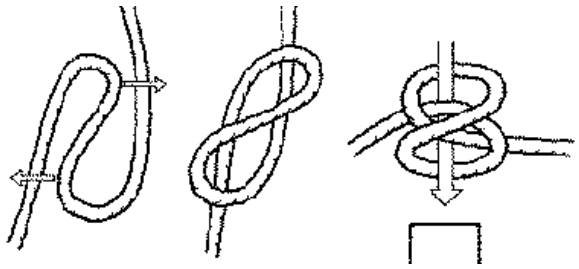
The strongest lash is made with two jam knots in the opposite diagonals. The knots should be brought together and tied off with a reef knot. The cords are cut off sufficiently long to be melted together.

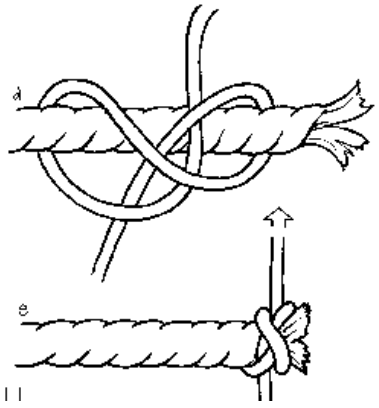
Constrictor Knot

This knot is a clove hitch with an additional step, an overhand knot tied under the crossing part. It is the most secure of all binding knots as long as it is tied around a convex surface. The tenacity of the knot makes it somewhat difficult to untie. If you want it to untie quickly, it may be "slipped."

The knot has many applications such as attaching cordage to a stick, to clamp splinters ski poles or canoe paddles, clamping, closing bags, hoisting objects and attaching a line or rope to a post or spar or another rope. It is also used for tying feather fletching on arrow shafts and for a quick whip on rope.

Begin with a clove hitch which can be made by forming an "S". Lay the ends over as shown. The knot is picked up through the holes and place over what need to be tied.





Joining Ropes

Sheet Bend

This is an important for joining two rope ends together and especially useful when the ropes are not of the same diameter. It should not be used if the ropes are going to be under a great strain.

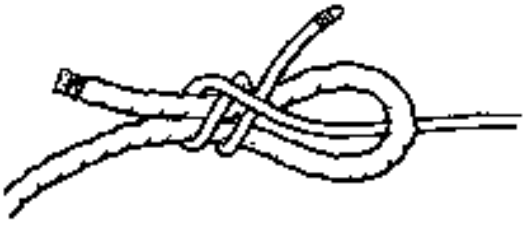
Create a bight in one rope. Feed the running end of the other rope through the centre of the bight. Bring the standing end back around behind the bight and back through the centre, underneath itself. Cinch the knot down by pulling on both ropes.

Double Sheet Bend

This is a knot that is even more secure that the sheet bend. It is useful with wet ropes, especially if they are of different thickness'. It will also provide a good strong join with even thickness ropes. It is useful where strain is constant and an ordinary sheet bend may slip.

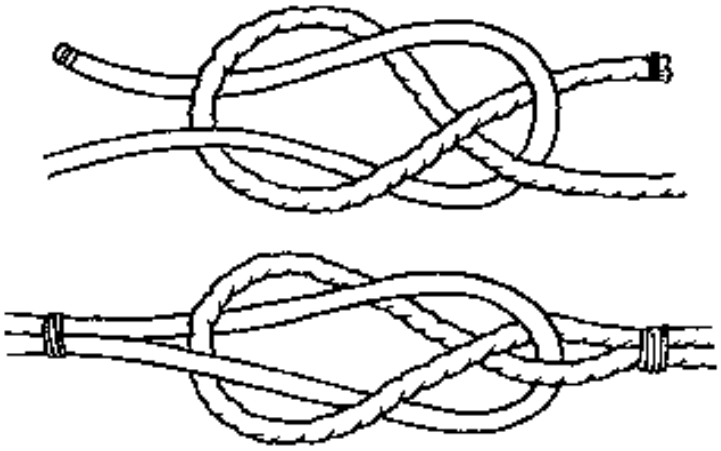
Make a loop in the thicker rope. Take the live end of the thinner rope through the loop, beneath the thicker live end and then forward on the outside of the loop and right around it. Bring the thin live end back between itself and the outside of the thick loop.

Take the thin live end and completely around the loop again and back through the same place on the outside of the thick loop. Draw it tight and ease into shape. If not tightened, these knots ten to work loose. Do not use smooth materials such as nylon fishing line.



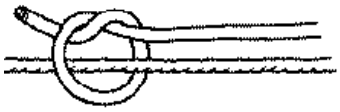
Carrick Bend

This bend should be used instead of a reef knot. It is a general heavy-duty bend of a special use with large rope. It is strong and secure and easily untied even when wet. It is necessary to seize the ends (lash together) when used with a very large rope (hausers.) In this knot the ends must be diagonally opposite. When the knot is tightened, the transformation of appearance it undergoes is no cause for concern as the knot continues to retain its full effectiveness. This somewhat complicated looking knot is not as well known as it ought be.



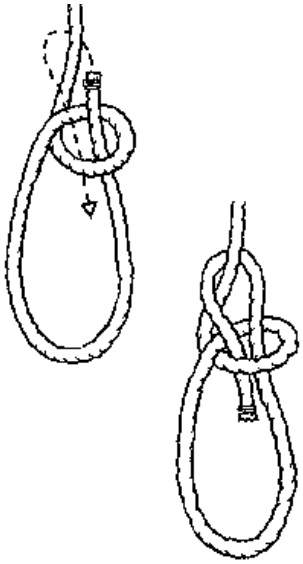
Fisherman's Knot

This is a useful knot when using light cordage and can take considerable strain and can be undone easily.



Overlap the ends of the lines, and with the free ends of each put an overhand knot around the standing part of the other. Draw them together until they lock firmly. Leave a reasonable tail below each overhand knot.

Loop-making *Bowline "The Queen of Knots"*

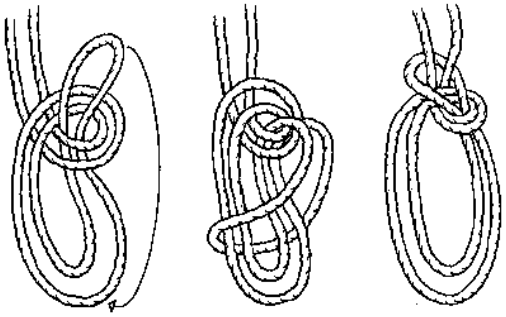


This quickly tied knot makes a loop that will neither tighten n slip under strain. It is used in end of a lifeline or wherever s a fixed loop is needed.

Make a small loop a little way along the rope. Bring the live end up through it, around the standing part and back down through the loop. Pull on the live end to tighten, easing the knot into shape. Finish off wi half-hitch.

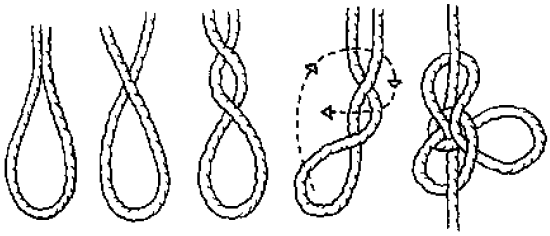
Remember this story: Make a (small loop). The rabbit (live through the hole, around the t part) and back into the hole a

Bowline-on-the bight



This is a useful knot for lifting someone from a asse or anyplace where they cannot climb out. e it with a doubled line, producing two loops ich will neither tighten or jam. It forms a kind of sun's chair, one loop fitting around the buttocks, e other around the upper body. As with any knot, ractice this before you need to know it.

Using the doubles line, form a loop and pass the ve end through it. Bring this end down and over e end of the large double loop now formed. Ease ick up to behind the standing part. Pull on the large double loop to tighten.



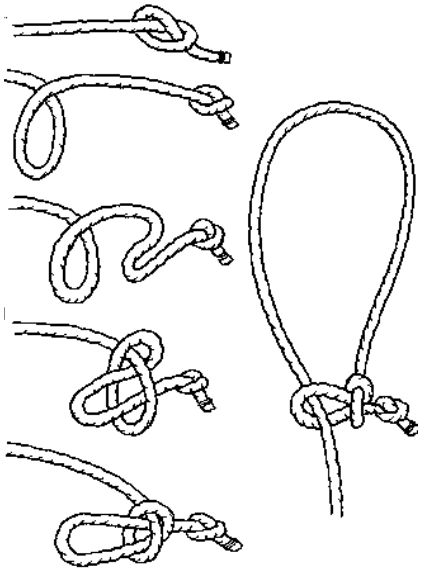
Manharness Hitch

This knot is also known as the Butterfly Knot, Lineman's Rider or Artillery Knot. It is a non-slip loop and one of the best of the single loops in the bight. It has the advantage that is can be made along the length of the rope but does not require access to an end. Several loops could be put on a rope for harnessing people to pull together in hauling or raising a weight.

Make a loop in the rope. Allow the left side of the rope to cross over the loop. Twist the loop. Pass it over the left part of the rope and through the upper part of the original loop. Pull the knot gently into shape, ease tight and test it carefully. Note: If this not is not eased tight correctly, it is possible to end up with a slipping knot.

Honda Knot

This is a knot that makes a free-running noose like a lasso. This one gives a clear circular loop suitable for throwing. Unless you are well practiced in throwing a lasso, catching animals with a lasso in a survival situation takes up a lot of time and energy.



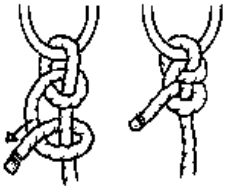
Start with an overhand knot. Form a loop further down the rope. Double the rope into a bight between loop and knot. Pass the bight through the loop. Tighten the loop around the bight. Pass the long end of the rope through the new eye formed by the bight.

Hitches

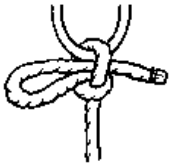
Half Hitch

Take the running end around an object and then around itself and back through.

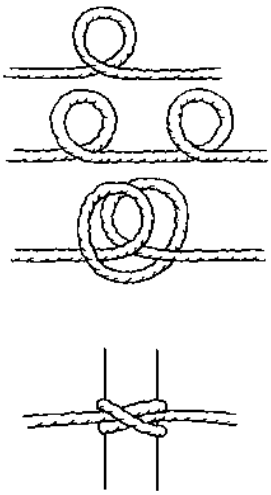
Half Hitch



Two Half Hitches



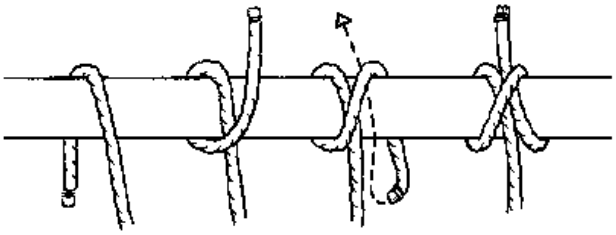
Slippery Half Hitch



Clove hitch

Make tow similar loops, side by side in the rope. Slide them together. Slip over the end of a pole and pull tight.

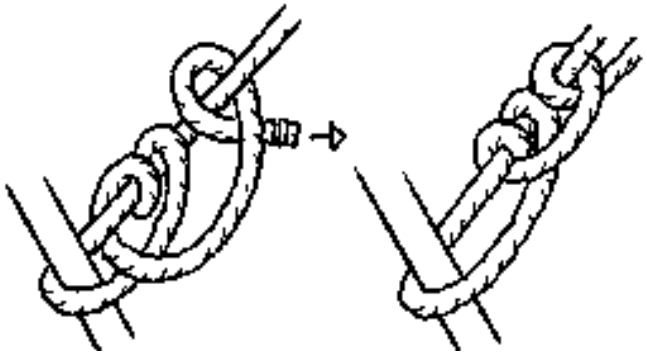
This is a very useful knot and is the start and finish of some lashings. It is used frequently around boats, gadget making, rope ladders and camp craft. Passing the rope around an object in one continuous direction puts little strain on the rope fibres.



Taut Line Hitch

This is a knot that slides and locks on a rope. It is excellent for the other end of a tarp because tension can be adjusted. It can be used from one rope to another or to itself.

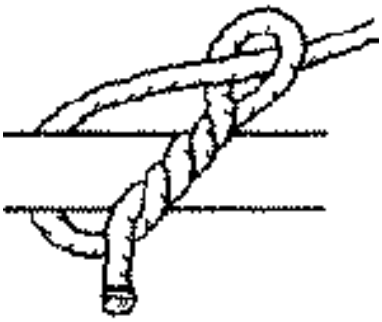
Wrap the running end of the rope around the standing end with two complete wraps. If you do any more greater friction is created. From the lower most wrap, bring the running end over itself, “bridging” the other wraps, back around the standing end, and then cinch the knot down. When cinched, friction keeps the knot from sliding on the standing end. By loosening the “bridge” you can slide the knot up and down and reset it.



Timber Hitch

This hitch is used for towing or lifting a log or spar. It has a high breaking strength and is impossible to jam. The end must be twisted around the other part in the same direction as they lay.

Bring the live end around the log and loosely around the standing end. Carry it forward and tuck it beneath the rope encircling the log. Twist it around as many times as comfortably fit. Tighten the knot by gently pulling on the standing end until a firm grip is achieved.

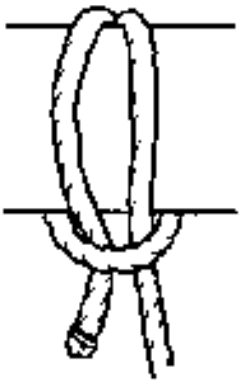


Larkshead or Cow Hitch

The larkshead is a knot of convenience only. It is not to be used when the rope will be subject to any degree of strain.

The larkshead makes a good sling but not for hooking the hook of a block to an anchorage with a strop. It is commonly used to hitch a horse to onto a post and to attach luggage tags.

To form the cow hitch, take a turn around the ring or spar, and pass the end over the standing part. Then take a second turn, but in the opposite direction to the first and tuck the end under itself, thereby forming a second standing part.

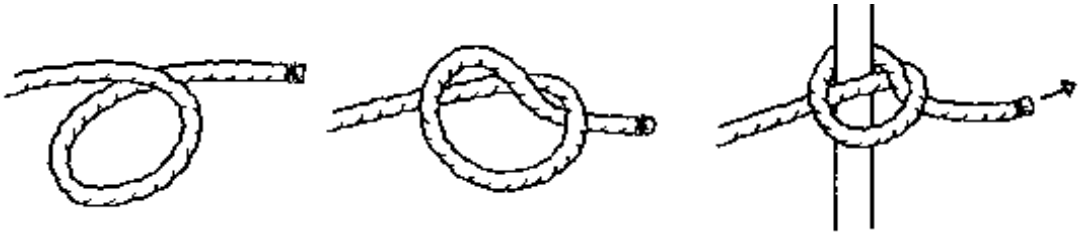


There is another way to tying this knot which is easier and simpler. Make a bight in the rope. Push this through the ring or over a spar and then pass the two ends through the bight. Unfortunately is it not always possible to do the knot this way.

Marlin Spike Hitch

This is a fast but temporary knot for securing a mooring line to a post. It is useful when tightening lashings.

Form a loop in the rope. Bring one side of the hoop back up, over the standing end. Drop this over the pole. The pole coming between the extended loop and the standing part. Pull the live end to tighten.

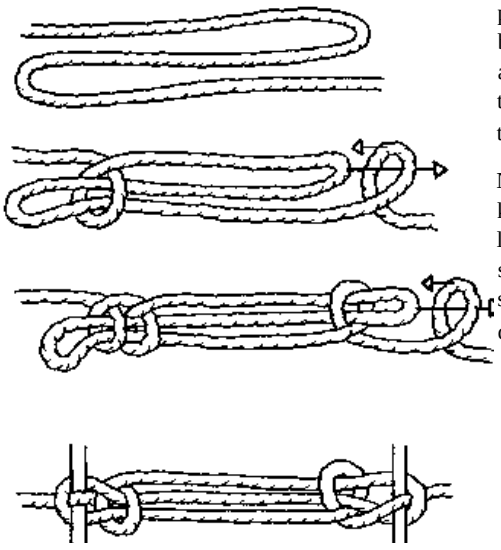


Shortening Rope

Sheepshank

This knot is used for shortening a long rope which is fastened at both ends.

Fold the line twice to take up the slack. Form an overhand loop and slide it over the bight and pull it taunt. DO the same at the other end to complete the knot. To loch the sheepshank and to keep the loops from sliding off, add a second half hitch at each end.



Make a sheepshank more secure by passing a stick through the bend and behind the standing part. If you have access to the rope's end, pass that through the bight. A stick would make this more secure.

Never cut a rope unnecessarily, you never know when you may be glad of its full length. A knotted rope has only half the strength of a continuous one. Use the sheepshank to shorten or to exclude a damaged or weakened section.

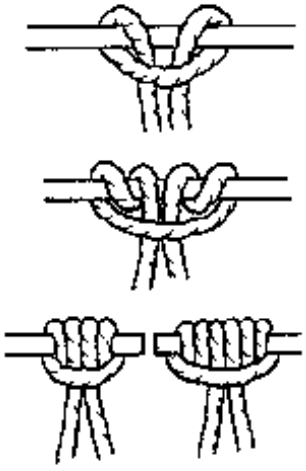
Securing Loads

Prusik Knot

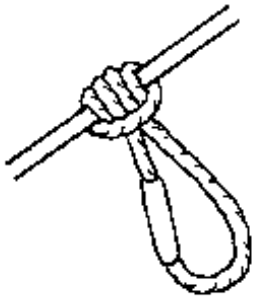
A knot that makes a sliding loop can be useful when attached along a climbing rope. It will not slip under tension but will slide when tension is released. Also useful for ropes that need re-tensioning from time to time such a guyline on a tent. A pair of prusik knots along a rope provide hand and foot hold for climbing or swinging along a horizontal line. They slide along the main rope as you proceed.

Pass a bight around the main rope and pill the ends through. Keep this loose. Take the ends over again and back down through the loop. Ease tight. Do not allow the circuits to overlap. This gives the appearance of four turns on the main rope. Mountaineers sometimes take the ends around again and back through to give the appearance of six turns on the main rope.

The prusik knot can be made using a fixed spliced loop, in which case pass the bight over the main rope and back through itself and repeat. For use as a tensioning line, attach the guy rope etc. and secure ends to an anchor.



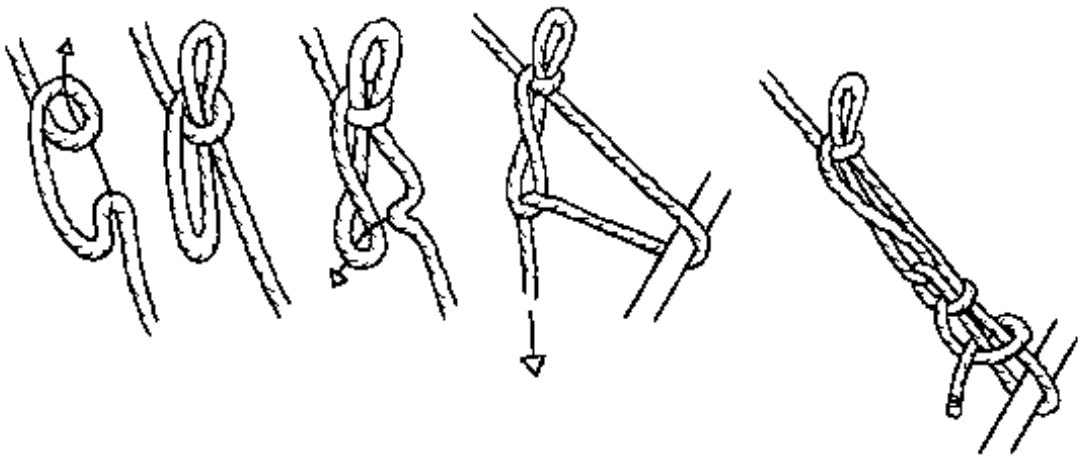
Note: When used for climbing or travelling along a rope, a spliced loop is safest. If you have no spliced loop, join the ends after the knot is made. Test joins rigorously before relying upon them.



Truckers Hitch

This is a useful knot for securing loads to a boat, raft or tying down a roof. It can be pulled tight and yet be released immediately. Also known as the Wakso Transport Knot. If it comes loose, undo the hitches, retighten and secure. This knot can also be used for a line across a river or chasm which needs tightening from time to time.

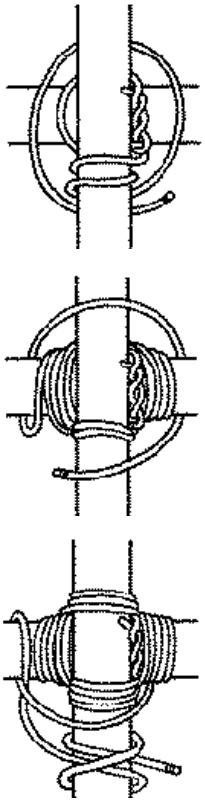
Make a loop in the rope. Further down, towards the end of the rope, make a bight. Pass the bight through the loop. Make a twist in the new lower loop. Pass the end of the rope around securing point and up through this twist. Pull on the end to tighten. This will give you a 2:1 mechanical advantage to pull the rope tight. Tie off the running end to some object or to itself with two half hitches.



Lashings

Lashings

The method of lashing depends on the position of the components. Lashings tie down or attach objects together so they will not move. Knowing how to lash is valuable for making shelters, rafts and other structures.



Square Lashing

Used for lashing spars which cross and is effective when set at right angles.

Prerequisites: timber hitch, half hitch, clove hitch

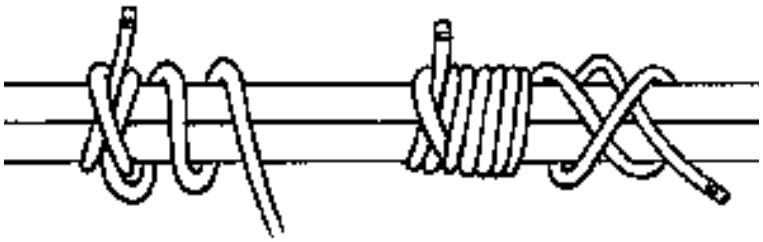
1. Make a timber hitch carrying the line alternately above and below both spars in a complete circuit before securing it. Then carry the rope over and under both spars in an anti clockwise direction.
2. After three or four circuits make a full turn around a spar and circuit in the opposite direction.
3. Complete the circuits with a half hitch around one spar and secure with a clove hitch on a spar at right angles.

Round Lashing

Used for connecting two spars beside each other to extend the length of the spar.

Prerequisite: clove hitch

1. Begin with a clove hitch around both spars. Bind rope around them.
2. Finish the knot with a clove hitch at the other end.
3. Force a wedge under the lashings to make them really tight. If the spars are vertical. Band the wedge in downwards.

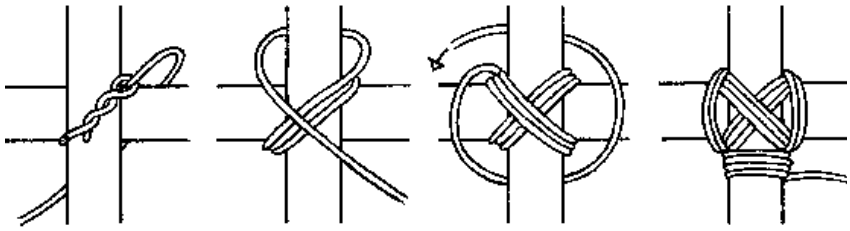


Diagonal Lashing

Use as an alternative to square lashing when spars do not cross at right angles or when the spars are under strain and have to be pulled towards one another for tying.

Prerequisites: timber hitch, clove hitch

1. Begin with a timber hitch around both spars diagonally.
2. Frap both spars with a few turns of rope over the timber hitch. Make a full turn under the bottom spar.
3. Frap across the diagonal then bring the rope back over one spar and make two or three circuits of the spars above the upper spar and below the lower.
4. Finish with a clove hitch on a convenient spar.



Shear Lashing

Used for tying the ends of two spars at an angle, for example, when making an A-frame.

Prerequisite: clove hitch

1. Begin with a clove hitch around one spar. Bind tightly around both spars.
2. Bring the rope between the spars and frap a couple of times around the binding.
3. Finish with a clove hitch around the other spar.

Splices

Splices are used to mend damaged rope or fasten one rope to another. A good splice has up to 95% of the rope's strength, while a knot's efficiency varies from 45 to 60% of the rope.

The short splice is the strongest way is that it cannot pass through a block.

The long splice allows the rope to run a block, and should be made only with two ropes of the same size, however, the log splice is time consuming to make and uses a lot of rope.

The eye splice is used in the end of a rope for mooring or for when a permanent loop is required.

The back splice is used for pointing a rope and is much superior to shipping.

Keep in mind the following when making splices:

To prevent the strand of rope from unravelling, they should be whipped or melted if the rope is synthetic and to prevent the rope from unravelling more than necessary, a constrictor knot may be tied at the required point.

A fid (a pointed, usually conical, tapered tool made of wood) is used for opening a rope when splicing. A tool with similar function made of steel is called the marlin spike.

Rolling under the foot smoothes out the surface of the splice and helps to even up the strains within the splice. Like rolling under the foot, gentle pounding helps to even out the adjustment of the strand.

When trimming the ends, if the ends are cut off too closely, they are apt to work out. Tapering is achieved by cutting away a portion of each strand as the splice continues in order to reduce the bulk of the splice. This is usually done more for appearance than for anything else. The strength and security is likely not enhanced.

Short Splice

A. Unlay the rope a few turns and alternate the strands.
B. Tie the strands down to prevent further unlaying.
C. Tuck one strand (#1) over an opposing strand and under the next strand.

D. The tuck of strand #2 goes over the first strand #5, under the second, and out between the second and third.
E. Repeat operations with the other two strands (#1 and #3) from the same rope end. Remove tie and repeat operation on the other rope end.
F. Make tow more tucks for each strand, roll tucks, clip ends.

Long Splice

A. Undo each rope about 15 turns and place the ropes together, alternating strands at each end.
B. Using opposite pairs, unlay (unravel) one strand (#4) and fill its place with its partner strand (#2). Repeat this exactly with another pair of strands (#1 and #6) in opposite directions.
C. Trim the longer strand (#4) and tie each pair of opposing strands (#2 and #4) with an overhand knot, tucking each strand twice. The tuck goes over one strand, under the second and out between the second and third. Strands #3 and #5 are simply tied with an overhand knot. Strands #1 and #6 are halved. Strands #3 and #5 are simply tied with an overhand knot. Strands #1 and #6 are halved, and opposite strands are tied with an overhand before tucking.
D. Rolls and pound tucks into the rope and clip the strand ends.

Eye Splice

A. Unlay the ends.
B. Strand #2 is tucked under strand C, under B and out between A and B.
C. Strand #1 is tucked once over B and under A.
D. Tuck strand #3.
E. Tuck each strand, in turn, tow more times. Clip ends.

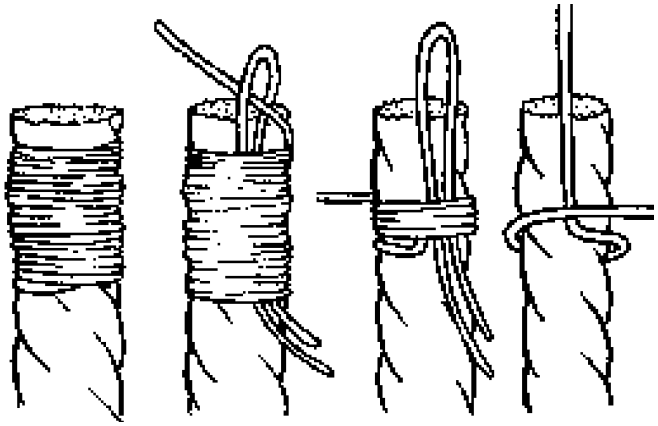
Back Splice

The ends are first laid over each other in a crown knot and protrude from the crown knot back along the standing part of the rope. They are tucked as in the short splice with the same over and under movement. Trim the ends and smooth the splice by rolling it on the floor with your foot.

Rope of any length should not be put into use without having had the ends properly prepared. Whipping is one way to prevent fraying and unravelling. Back splicing is a durable method.

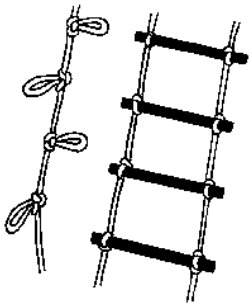
Whipping

Whipping is binding the end of a rope with twine to prevent it fraying or unlaying.



Project Ideas

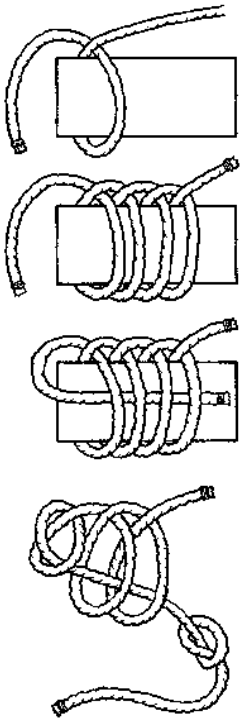
Make a ladder



A ladder can be made by simply tying as many Manharness hitches in a rope as you need for hands and feet. It could also be made with rungs by using strong sticks or other pieces or wood.

Use two ropes or a long rope, doubled, with Manharness hitches placed equally along both side to make a rope ladder. Pass sticks through the corresponding loops as you make the loops and ease tight to hold the sticks firmly. Allow the sticks to project a reasonable amount on either side of the ropes for safety and test each for strength.

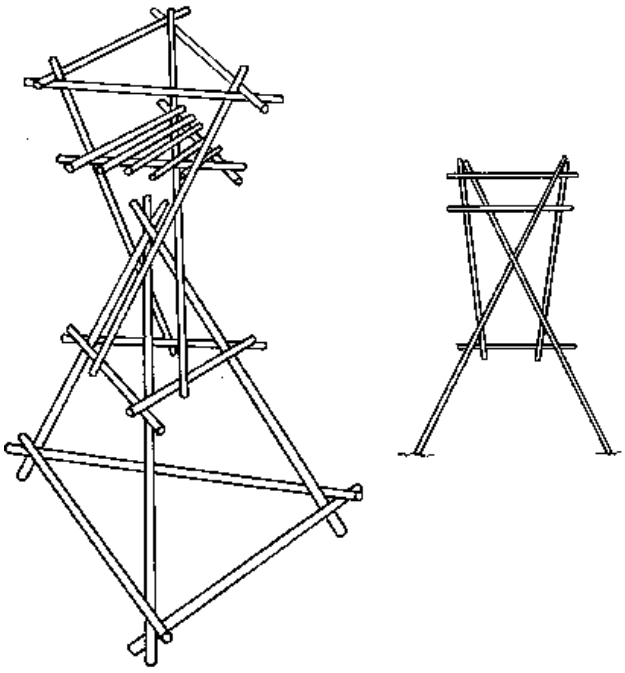
Make a Ladder of Knots



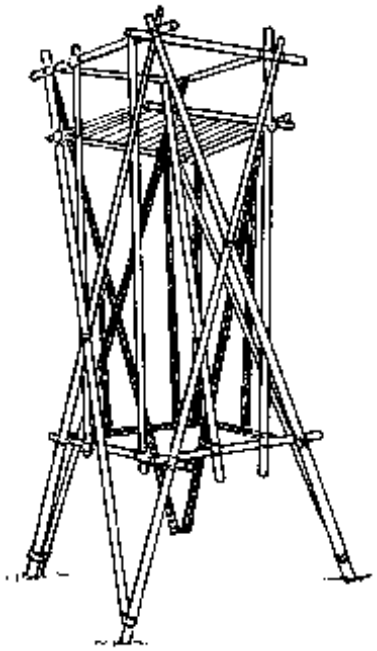
A series of overhand knots tied at intervals along a smooth rope will make climbing a rope much easier. There is a fast way of making the knots once you have the knack.

Leaving a reasonably long free end, make a half-hitch near the end of a short piece of a branch or log. Continue making loose half-hitches along the log, the diameter of which will fix the spacing of the knots. Pass the start end back through all the loops and then slide them all off the end of the log. As each turn of rope goes through the centre of the half-hitch loops to other end, shape and tighten each knot.

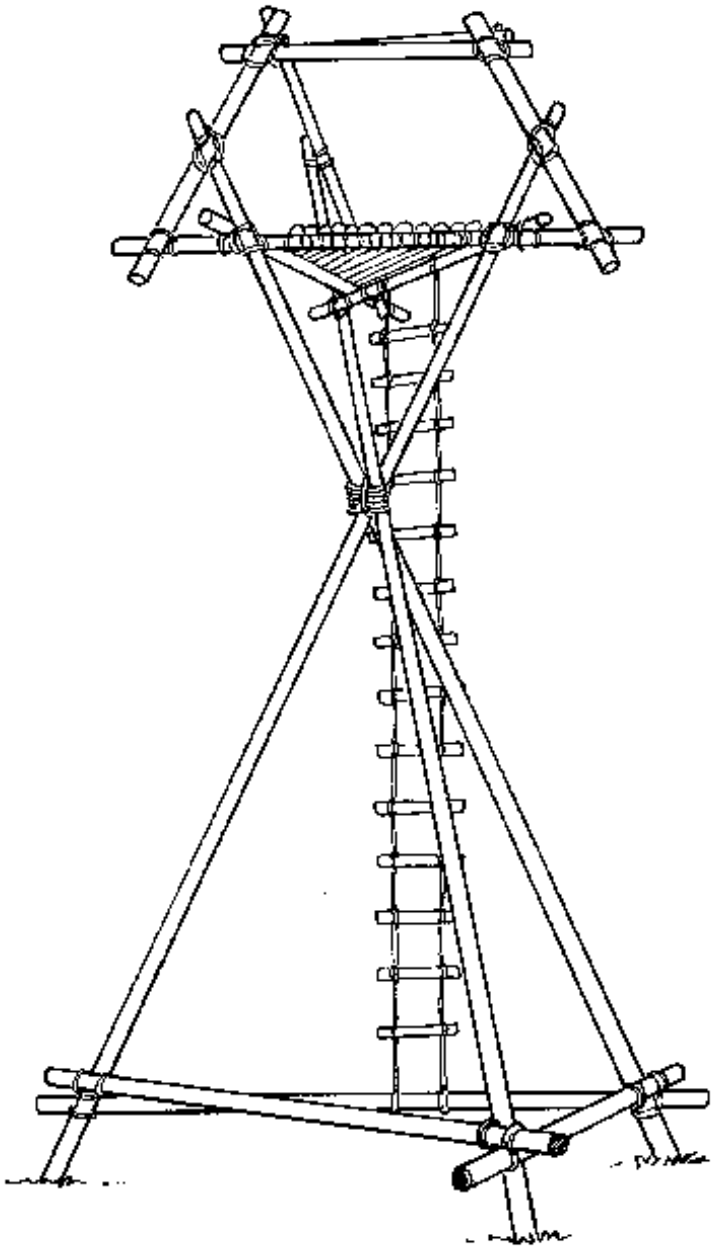
If you know the length of your rope, you can estimate the number of knots needed. With a half-hitch for every knot, choose a thickness of log to allow the required number of turns, and therefore the required number of knots.



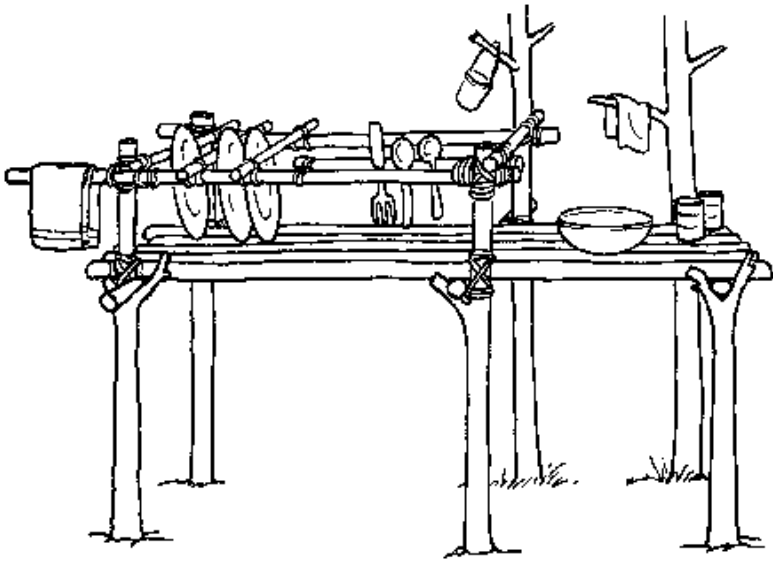
The Corkscrew Tower



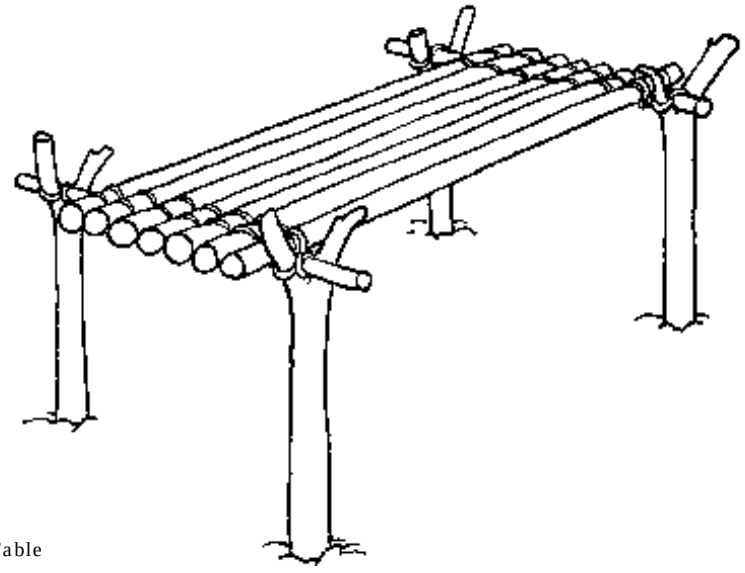
The Dan Beard Tower



The Bryanbach Tower



Camp Dish Rack



Pole Table

Last revised: 12/00

APPENDIX III

Wild Edibles

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Wild Edibles

This information is provided so Wardens are aware of the literature on the subject of eating wild edibles versus fasting. Should Wardens ever be in a situation where they may have to make this decision, they can make a decision based on factual information.

Wild Edibles

To Eat or to Fast - That is The Question

In attempting to live off the land, it is more preferable to only drink water, than to eat less than the minimum number of calories required each day. By not meeting the basal metabolic rate, which can be from 1,100 to 1,700 calories per day, there is such a disproportionate use of protein reserves in comparison to fat reserves that one may die of protein depletion in at least a quarter of the time as compared to fasting. In fasting there is a more balanced use of proteins and fats so that a healthy person of normal weight of 65 kg will not begin to suffer any irreversible deficiencies for at least six weeks. Overweight people may get by for longer than this. The record stands at over a year.

By realizing that there is no need to eat for six weeks, panic may be more easily held in check. Fasting can act as the stopgap measure until you have had the time and opportunity to become competent in living off the land. You can learn fasting techniques in less time than you can learn to use one edible plant. In some instances you may have no choice but to fast. Unless you are reasonably expert and well practiced in hunting and trapping, and game is plentiful, or you happen to have a firearm, you may mismanage your energy budget. You could spend more energy catching and eating the animal that you would have saved by resting. This takes into account any fruitless attempts. If you are to subsist on plants you may have to know anywhere from 50 to 200 to have a workable number in your given area of survival.

Fasting usually brings on greater clarity of thought and improves recall that assist in making plans and decisions. In a true fasting state, within two to six days your energy reserves become available to be used at a more normal rate of expenditure. You may not feel like it, but you can now exert yourself to the point of expending 4-5,000 calories per day. On a diet that is less than your basic metabolic rate you may collapse from exhaustion. If you are going to walk out, you will do better in a fasting state. In a Swedish experiment, 10 people walked 320 miles in 10 days injecting only the spring water found en route. On being examined by doctors after the walk, all were in a perfect state of health.

Generally, you heal more quickly in a fasting state and overcome any illness more readily. The ketosis in fasting

usually brings on euphoria, making the discomforts of survival more tolerable and any depression less acute.

To fast, simply eat nothing and drink far more water that you normally would. The water should be brought to a boil and drunk as hot as possible.

Problems with Fasting

Ketosis is a build up of undesirable levels of ketones in the blood and is a by-product of fat reserve metabolism. This was once thought to be a dangerous condition to be avoided, probably because of the association of ketones with other often-grave diseased states. The situations may be somewhat eased by drinking more water. One should attempt to make the urine as colourless as possible. Drinking too much water can make you ill as well. Some euphoric irrationality is also associated with the ketosis.

The general impression seems to be that the first major fast is the most uncomfortable one. Your past eating habits may also have a considerable influence on the ease of comfort experienced in your first fast. Once you have detoxified, you may find fasting to be relatively pleasant. The detoxification process works on the principle that your body will burn up fast what it needs the least. The substance first burned up are those that accumulate in your body that can not be eliminated by the normal process. Uric acid and cholesterol are the first substances to go.

Some of the unpleasant and temporary side effects that you might expect are: foul breath, severe headaches, aching joints and teeth, loose teeth, coated tongue, boils, foul odour about the body, pains of various levels of intensity in the esophagus, and fasting may also result in prescription glasses becoming too strong. These conditions are far more tolerable than the conditions associated with death in a quarter of the time.

Some Reasons for Using Wild Edible Plants

1. Wild edible plants can be a hedge against hard times, be they wilderness survival, times of scarcity or outright poverty. The use of wild edibles may be a means of reducing pressure on conventional supplies in times of need.
2. Wild edibles can add a variety to an otherwise monotonous diet. This was an important consideration in pioneer days.
3. Most of the plants in this appendix have an especially high content of vitamins and minerals. During pioneer days, wild edibles were used to supplement a deficient diet, especially at the end of a long winter when garden plants were months away from being available. Old timers can still be encounters who can recall using cow parsnip, marsh marigold, stinging nettle and cattail as early spring vegetables.
4. Learning to use wild plants as food can help you to better understand how natural communities work. By learning to manage edible plants in a way that ensures the ongoing availability of these plants, you can develop a responsible relationship with this natural resource.

A definite responsibility rests with everyone who uses wild plants, to know enough about them to properly conserve them. You should have some idea as to whether the plant is rare, slow to regenerate or readily eradicated by certain methods of gathering. What forms of harvesting does the plant react to most favourably?

Some plants may best tolerate being pulled up while others prefer to be sheared off if eaten by a rodent or ungulate. Will leaving parts of plants start a new one? Does the plant readily grow from seed? Can a rare or more desirable plant be encouraged to grow in your garden especially when nearby competition is removed? Once planted it can provide a handsome return for a minimum of tending.

The plants in this appendix were chosen with the knowledge that they tend to respond favourably to usage and none are rare in Alberta. All the same, they should still be used by the same conservation rules that apply to the gathering of all plants, common or rare.

Gathering

1. Gather plants only where you are not prohibited to do so by law. Laws protect all plants within Provincial and National Parks and Reserves. Anyone picking, damaging or transplanting any plants can be prosecuted. Some municipalities have regulations governing the gathering of plants, trees and shrubs in their jurisdictions. Some plants are protected by law, for example, the Western Blue Flag.
2. Plants should not be gathered where they serve the public in any way, such as along trails, nature walks or in school study areas.
3. Gather plants where the collecting activity, especially digging for roots, will not contribute to erosion or create any other unacceptable effect.
4. Collect only what you can use. If it is the leaves you want, pick only those you can use, leaving the rest of the plant uninjured. When using the roots of perennials be sparing, use cup quantities rather than litres. When collecting parts other than the root, leave the root intact.
5. Vigorous, introduced plants should be considered fairer game than less competitive native ones.
6. Create as little disturbance as possible to the surrounding vegetation with your foraging activities.
7. When you have determined that your plant is obviously abundant and thriving and you have ascertained that it will tolerate harvesting (through the literature mostly), you may consider collecting it in the following manner.
   - First, take the overcrowded plants.
   - Depending on prevalence and other factors, you may take one in five if the plant is common, one in 10 if less common, and one in 20 if somewhat scarce in any given locale.
8. There are places where plants may not be fit for consumption. Plants near a well-travelled road may have a higher than normal lead content from vehicle exhaust. Avoid collecting plants where herbicide use is suspected, such as along some municipal roads, railroad corridors, power line right of ways and near fruit orchards.

Positive Identification

It cannot be over-emphasized that you should be positive about the identification of the plants you plan to eat. Your enthusiasm in the use of wild plants should be tempered by a cautious and careful attitude. Although relatively rare, there are plants that can kill. Learning the scientific name of the plants you can use can be very important. A plant can have many common names and many different plants can end up with the same common name, especially in different parts of the country.

The common name is very much like a nickname. The scientific name is the one and only name assigned to a particular plant throughout the whole world. The scientific name comes in two parts, the first part is known as the Genus. It is always capitalized and is analogous to a person's surname. The second part, which is not capitalized, is known as the species and corresponds to one's given name. The scientific or Latin names will be underlined or in italic.

Unless you learn to use the scientific name of a plant, there may be many instances where others will not be sure what plant you talking about when you are seeking assistance in identification. It is essential to know the plant's identification if you are trying to tell a doctor what plant it was that you think made you ill.

Occasionally, you may encounter a statement such as "the Viola species are edible." By this we mean that all plants of the Genus Viola are edible. Although occasionally there are plants where the whole Genus is edible, one must not assume that if one plant in a Genus is edible, that all plants in that Genus are. You can have edible and toxic plants in the same Genus. If there is the slightest doubt about a plant's identification get an expert opinion or leave it alone.

Eating Wild Plants

Generally, the taste of any wild plant is a new experience to the normal palate. Some plants can be uncommonly bitter on the one extreme and completely tasteless on the other.

In comparison to our garden vegetables, the wild plants contain more nutrient gram for gram, mainly because they are of much lower water content. You may find that eating less than half the quantity expected for a domestic vegetable may adequately meet one's nutritional needs.

Acclimatizing to Wild Plant Food

Simply sampling a known wild edible can cause sharp stomach pains in some people. Accepting wild plants and mastering their use is a skill that requires persistence and concerted application. This is likely one of the greatest achievements in wilderness living skills.

By becoming thoroughly knowledgeable about edible plants, you will develop confidence in your abilities to safely use wild plant foods. The plants chosen in this Appendix are similar enough to the taste and texture of familiar vegetables to make their use relatively easy. The other 900 wild edible plants of Alberta may demand a considerably greater effort from both the body and the mind to accept them. You may need to gradually include a plant in your diet before your body can tolerate or properly digest any great quantity of it.

The first step is to begin eating a plant in small quantities until you become accustomed to the taste. Your gut might also require time to develop the flora that may better handle the new food. As you become accustomed to the plant you may gradually increase the amounts perhaps without experiencing any unusual digestive disturbances. It bears repeating that care must be taken to use wild plants in moderation not only as a conservative measure but to avoid excessive stomach pain.

It is a bit too late to begin the process of familiarizing yourself with a plant in an actual survival situation. You may find you've burned up more energy gathering and trying to use it than you've gained back by digesting it.

Edible Plants

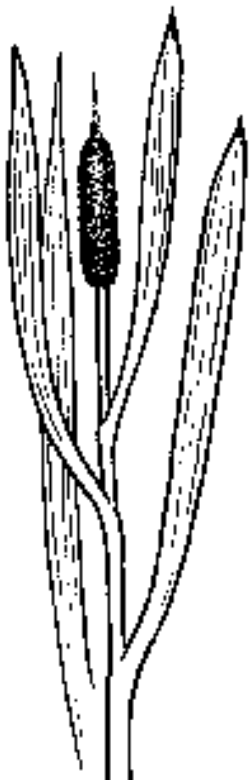
Use the information about the plants listed below as a guideline. Buy yourself a good field guide book and use it frequently. Take advantage of every and any opportunity to learn about wild edibles, for example, first hand experiences, slide shows, books, and talking with others.

Below are a few suggestions to help you begin and nurture your identification skills.

- ❍ Find a field guide to suit your knowledge of botany and identification skills.
- ❍ Make notes in your personal copy of a field guide with the important plants listed below.
- ❍ Take your Junior Forest Warden group on an outing and identify the plants in the spring and summer.
- ❍ Take every opportunity to learn about edible plants and try to find some on every outing. Challenge Wardens to do the same on every outing.
- ❍ Make a plant press and file the pressed samples in a binder to help maintain your identification skills.
- ❍ Talk to other JFW leaders and Wardens or take a walk with them to learn more about wild edibles.
- ❍ Have a guest speaker in with slides to talk about wild edibles.
- ❍ Take a course about wild edibles from an experienced gatherer.
- ❍ Take photographs and keep a scrapbook for your own field guide reference.
- ❍ Practice, practice, practice.

The Plants (more or less in order of importance)

1. Cattail (Typha species)



The cornucopious cattail, from the tips of its roots to the tip of it's flowering stalk, sooner or later some part of the cattail becomes edible.

Root Starch

The thick puffy rind of the root is peeled away to expose a core that may be as thick as a pencil. This core consists of starch packed away amongst rather bothersome strong thin fibers. The fibers may be dealt with by:

i. roasting until they are brittle

ii. by chopping the core into fine pieces

iii. by washing out the startch and discarding the fiber

iv. by drying the core, then pulvorizing it by pounding

Some authorities claim that a heavy growth of cattail can produce about 6,700 kilograms per hectare of startch (or 6,000 pounds per acre). No feasable commercial process has yet been developed to exploit this tremendous resource.

The starch can be used in place of flour for cakes and pancakes.

Shoots

The plant extends itself by horizontally advancing shoots. Although there are more prevalent in early spring, they can be found at any time of the year. There is usually from 8 to 16 cm of edible shoots that may be eaten raw or cooked, with numerous shoots on each plant.

Stem

In late spring the stem may be pulled up and eaten raw or cooked. The plants without stems have a lump of starch at the junction of the plant and the root that is cooked like potatoes.

Head

Heads that are still in the sheath (in June) are boiled and eaten like corn. There is a tedious method of extracting the somewhat oily seeds from the head. The pollen bearing spike is a more productive endeavor. Before it matures it is scraped to produce a thickener for soup. The pollen itself is later gathered in early August by enclosing the head in a bag, bending the plant over and giving it a rap to dislodge the pollen. The pollen can be used as a flour substitute.

Bear Root or Sweet Vetch (Hedysarum boreale)

xt to the cattail this is one of the most important wild ibles in Alberta. Bear root is available throughout the mmer. It's taste changes by the way it is prepared. The ots are hard to dig and taste best just after the shoots ve started to come out. The raw root tastes like a xture of coconut and peas. It was used as a licrice substitute by the First nations People and early settlers. The baked roots taste like potatoe chips, and the fried ot, like a parsnip. Bears are fond of this root and you ıy sometimes see where they have dug a hole for the ots. Allergy Caution: Those allergic to any foods, pecially fruits, may react violently to this plant.

Wild Rose (Rosa species, especially Rosa acicularis)

rose hip

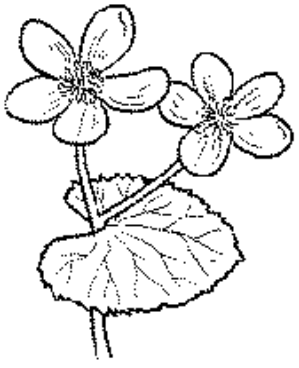
ıen the first frost occurs, the rose) (the mature seed container) is at its best. The fleshy part of the hip can be eaten raw or added to other foods and soups. Rose hips are renowned for their vitamin C content: eating five to 10 hips may provide you with your daily vitamin C requirement.

4. Stinging Nettle (Urtica species, especially Urtica gracilis)

The stinging principle, formic acid, is destroyed by heat in about 15 seconds of boiling. The tops are gathered in May when the plant is no more than 15 cm tall and cooked in as little water as possible. This ranks as one of the more tasty and nutricious edibles available.

5. Marsh Marigold (Galtha palustris)

This plant is usually available in early spring and is best picked before the plant blooms. The plant contains a toxic glyceride that is destroyed by boiling. A bitter component may require the cooking water to be changed once or twice.



6. Dandelion (Taraxacum officinale)

The tender leaves make an excellent salad ingredient. Protecting leaves from the sun with a board produces especially tender, pale leaves. The roasted fresh root is quite tasty. Dried, roasted and ground, the root makes an interesting coffee substitute. Dandelion may be one of the most nutricious plants growing on any lawn.

7. Quackgrass (Agropyron repens)

The roots are roasted at any time of the year. Quackgrass is a very nutricious but maligned and neglected edible.

Fire Weed (Epilobium angusti folium and E. latifolium)

shoots are boiled and the core of the
ure stalk is eaten raw.The flowering
d is used to thicken stews. The dried
soms and leaves can be used to make
t tea.

Cow Parsnip (Heracleum maximum)

ore the leaves open, the stalks are peeled and
n raw or cooked. This skin has to be peeled off before
e because it contains a substance which, if eaten, can
nduce a photodermic rash. The contents of the seed
nead, before it opens, are used in salads. The root is cooked like rutabaga or turnip.

Caution: Be sure not to confuse this plant with a similar looking but notoriously one known as water hemlock (Cicuta species).

Cow Parsnip

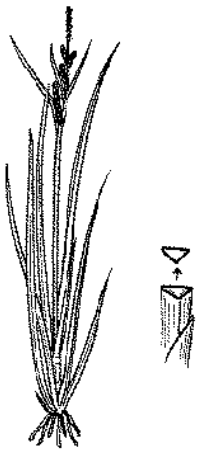
Water Hemlock

10. Timothy (Phyleum pratense)

In the fall, the ripe heads are stripped off, crushed and winnowed to extract great quantities of seed resembling miniature wheat. The seeds can be crushed and made into gruel.

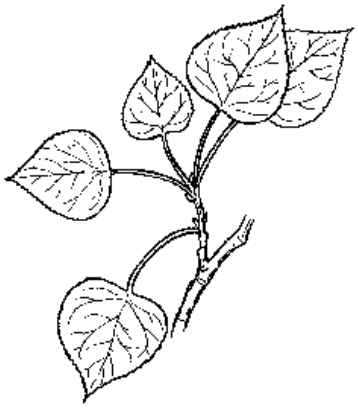
11. Sedges (Carew species, especially Carew aquatillis)

From May until August, the tender hearts of this grass-like plant are eaten raw or cooked.



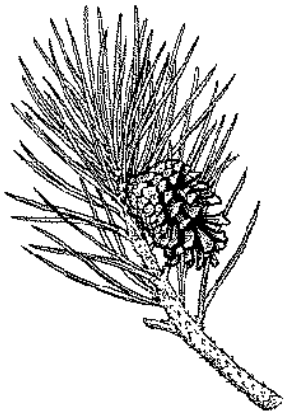
12. Silverweed (Potentilla anserina)

In spring and fall the root is eaten raw, roasted, boiled or fried. The dried root has a pleasant nutty flavour. Delicious, similar to parsnips and sweet potatoes in taste.



13. Aspen (Populus tremuloides)

In late May to mid-July when the bark is easily removed from the tree, the surface of the wood or cambium layer is scraped with a knife to obtain a sweet, juicy, stringy material, sometimes called Indian Spaghetti. It is eaten raw or dried for future use.

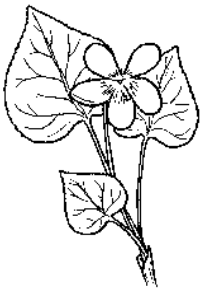


14. Lodgepole Pine (Pinus contorta)

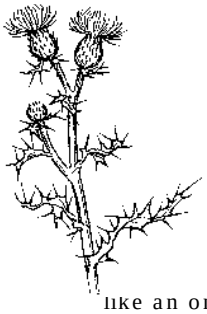
Use it exactly the same way as aspen.

15. Violets (Viola species, especially Viola canadensis)

From spring to first frost the whole pla
can be boiled like spinach.



16. Thistles (Circium species, especially C. hookerianum)

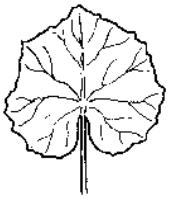


core of the young plant
n raw and the roots car
aw, boiled or roasted. Tl
eeds make a good timbe

17. Wild Onions (Allium species, especially A. schoenoprasum)

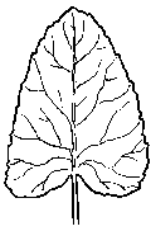
plant must look, smell and tast
like an onion and taste like an onion or
it may be confused with Death Camus
(Zigadenus elegans.) Use all parts at any time
the year.

Caution: Excessive use could cause anemia.



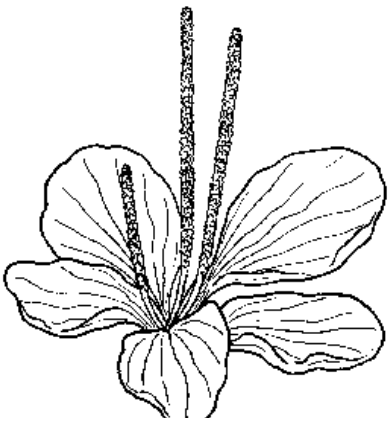
18. Coltsfoot (Tussilago farfara)

The round leaves are cooked like spinach.
Yellow flowers, stalks have reddish scales. The
green leaves can be rolled into tight balls,
thouroughly dried, burned to ash, and then use
as a passable salt substitute. Dried leaves mak
fragrant tea.

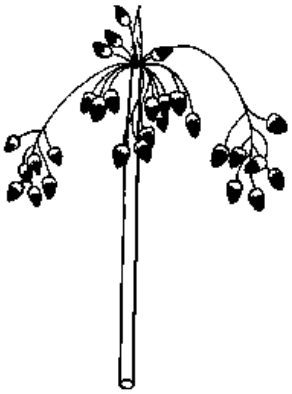


19. Plantain (Plantago major)

The young leaves w
veins removed are
spinach. The dry ro
edible. The main pa
almost like celery h
taste.

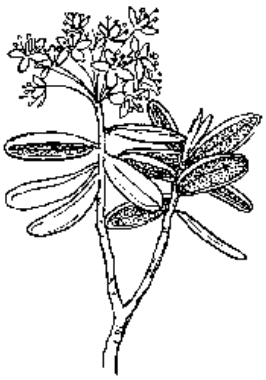


20. Bulrush or Tule (Scirpus validus)



g shoots are peeled and eaten raw or cooked.
ts are processes similar to cattail roots. The
can be ground for mush or flour.

21. Labador Tea (Ledum groenlandicu



At any time of the year, leaves may be boiled to Jasmine-like tea or dried ed in the normal fashion. deration until you are use mach cramps and may result.

22. Lamb's Quarters (Chenopo album)

r th
ts a
n. Lamb's Quarters has a in A and C content than The tender leaves may be lads and seeds boiled and make gruel.

tion: Leaves with reddish ld not be eaten. Oxilates are particularily high in ate summer and fall, so it best not to use this plant at this time of year. xalates give a tangy taste d can interfere signifi- ly with your body's ability rb calcium from food.

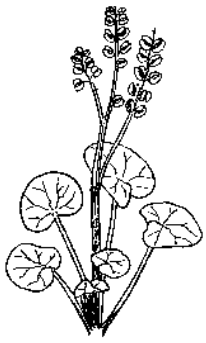
23. Curly Dock (Rumex crispus)

In the spring the very young leaves are cooked like spinach in several changes of water.

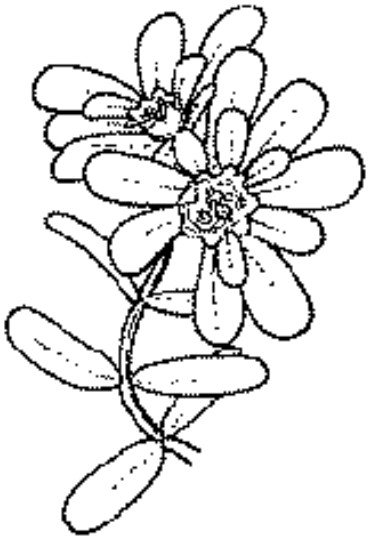
24. Mountain Sorrel or Sour/scurvy Grass (Rumex acetosella)and Sheep Sorrel (Oxyria dignia)

From spring until fall the leaves are cooked like spinach and made into soups with other ingredients. **Note:** Like rhubarb, Rumes contain oxalates. Oxalates give a tangy taste and can interfere significantly with your body's ability to absorb calcium from food.

Sheep Sorrel



Mountain Sorrel



25. Purslane (Portulaca oleracea)

From spring until fall the whole plant is cooked like spinach or used raw in salads.

26. Common Chickweed (Stellaria media)

From early spring to first f
whole plant or sprouts in s

Edible Mushrooms

One of the more common misconceptions about mushrooms is that they have no food value. Many survival manuals suggest that mushrooms should be avoided altogether as the risk is much too great for the small benefit gained. There tends to be a view that mushrooms are a luxury vegetable, providing only variety and an agreeable flavour to otherwise ordinary dishes. Their main justification for use is that they have always been seen as only flavour for soups, sauces and gravies and as a garnish on accompanying dishes.

This view is changing. Mushrooms are proving to be a rather significant source of protein. Being about 37 % protein by dry weight, mushrooms also rank high in chromium nutrients as well as being a source of phosphorous, copper, iron, potassium, thiamin, riboflavin and niacin. Mushrooms also contain varying degrees of all essential amino acids and body building acids, especially the somewhat less common folic acid.

Mushrooms are low in calories, containing about 235 calories per kilogram. Mushrooms contain little sodium.

Collecting Mushrooms

There are safe ways of using mushrooms and some pitfalls. Below are the pitfalls you may encounter:

1. Never eat any mushroom or fungus that you do not know well. Avoid all risk of making a mistake. Pay attention. Be cautious. Be prudent.
2. Go slow in adding to your list of edibles. Limit efforts to well defined types.
3. Realize that a young child or an elderly person may react adversely to a mushroom that is perfectly edible to teenagers and adults.
4. Certain digestive upsets commonly associated with mushrooms are usually the result of the overuse of butter or cooking oil rather than the mushrooms themselves.
5. Do not assume that a given mushroom is not poisonous because it comes from a species that is not poisonous.
6. For reasons yet little understood, some species of mushroom may be toxic in one locale and safe in another. The same looking mushroom on Vancouver Island may be

safe yet those growing in Ontario may be lethal. European mushroom lovers who have immigrated here should double-check any similar-looking mushrooms that they find in this country before they use them.

7. There are a few people who will react violently to a mushroom that is safe to everyone else.
8. In some species a fresh mushroom may be quite safe, yet in an old or decaying state it is toxic. Use only fresh mushrooms and discard everything else.
9. Some mushrooms are toxic raw but perfectly safe cooked. DO not assume that all edible mushrooms may be eaten raw.
10. Some mushrooms become toxic if frozen.
11. It has been observed that some animals such as rabbits, squirrels and deer can safely eat certain poisonous mushrooms which would cause certain death to humans. Observing an animal eating a mushroom is no assurance that it is safe for people.
12. The presence of insects or worms in a fungus is no clue to its edibility.
13. The poisonous quality of a mushroom cannot be determined by whether or not silver tarnishes nor by any other simple chemical test.
14. The safe or poisonous quality of a mushroom cannot be determined by the ease of peeling the cap.
15. It is dangerous to assume that soaking or boiling in salt water may neutralize all or any poisonous mushroom. The worst mushrooms to start with are those that have some probability of being confused with dangerous types.
16. Do not experiment with mushrooms. Taking a small amount will not prove that a mushroom will be safe to eat in larger quantities. Your body may have the capacity to effectively deal with small quantities of certain toxic elements. Some mushrooms may be lethal in minute quantities. The toxicity in some mushrooms may vary considerably from place to place.
17. Unless you know what you are doing, do not collect mushrooms in the button stage, because poisonous and non-poisonous mushrooms may appear very similar at this stage.
18. Beware of mushrooms with similar appearances growing intermixed with each other, singly or in clumps. Pay attention. Be cautious. Be prudent.

Identifying Mushrooms

Many people would prepare mushrooms for the table if they had the confidence to believe in their ability to positively identify the edible mushrooms from the poisonous ones.

The mushrooms that are appropriate for the beginning collector are ones that are easy to identify positively. There are at least a dozen one can start with, and for most of us these are sufficient to provide a lifetime of enjoyment.

A common question that has been asked is how to distinguish a poisonous mushroom from a safe one. There is no general rule or test that will help you to separate one from the other except knowing each and every species of mushroom by its own characteristics. Until you are absolutely sure that you have properly identified a mushroom you are wise not to eat it.

We recognize our friends by many characteristics that combine to make the person look like our friend: eyes, hair, nose, ears, voice, height, the walk and so on. The same applies to the great majority of the mushrooms you may encounter in the field. There are also some mushrooms that tax the abilities of the most experienced of mycologists.

If you are anxious to use some mushrooms right away and you want to work alone you can start with the following list. The first four are so easy to identify that we call them the foolproof four. They are abundant, widespread and good tasting. They are the morels, puffballs, shaggy mane and coral fungus.

If you pay attention to the positive identifying feature and the diagram there is only the remotest chance of error.

Morels (Morchellaecae)

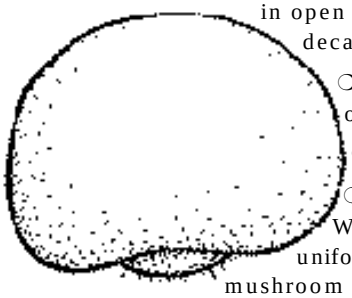
Their taste is delectable.

- In early spring look for this mushroom in mature aspen forest. Avoid morel-like mushrooms in summer and fall, they are usually false morels.
- The cap has irregular pits and ridges of a brown to tan colour. Looks a bit like honeycombs. (False morels look like exposed brains.) A similar mushroom found as the same time in the same environment in Verpa boehemica. Some people may encounter digestive problems with this mushroom.
- The cap and stem are continuous and hollow as illustrated. The flesh of both cap and stem are brittle.

Puffballs (Lycoperdaceae)

Their taste is good.

- Puffballs may be found at anytime and especially in the fall in open forests. Look everywhere on the ground or on decaying wood.



- The size may vary from that of a grape to that of a watermelon.
- The shape is generally spherical or rounded.
- Edible when young and the flesh is white. When sliced in half, the interior must be white, uniform and firm. If the outline of a small mushroom is visible you may have an amanita which could be poisonous.

Shaggy Mane (Coprinaceae)

Their taste is excellent.

- They look like a closed erect umbrella when young, spreading with age.
- This mushroom is usually found in the same place, year after year. It appears after the first frost in the fall. The shaggy mane prefers sandy soil.
- The coprinus family to which the shaggy mane belongs are the only mushrooms that dissolve into a bla inky mass as they grow old due to digestive enzymes.

Coral Fungus (Clavariaceae)

Their texture is a bit tough.

- Usually found on fallen, decaying black poplar trees.
- Insects seldom inhabit this fungus.

branched clumps showing that point downward like

Other Mushrooms

If you are more adventuresome, you might consider adding the following to your list. They are easy to identify if you look them up in a good book about mushrooms.

- False Morels (Helvellaceae) POISONOUS
- Pasture or Field Mushroom (Agaricus campestris)
- Delicious Milkcap (Lactarius deliciosus)
- King Bolete (Boletus edulis)
- Yellow Cracked Bolete (Boletus subomentosus)
- Scaly Hedgehog (Sarodon imbricatus)
- Honey Mushroom (Armillariella mellea)
- Oyster Mushroom (Pleurotus ostraetus)

Information gleaned from articles written by Mors Kochanski

Supporting Resources

Books

Edible and Medicinal Plants of the Rocky Mountains and Neighbouring Territories Terry Willard. 1992. ISBN 0-9691727-2-9 Published and available from: Wild Rose College of Healing, Ltd. 302, 1220 Kensington Road N. W., Calgary, Alberta T2N 3P5.

This is an excellent book full of information and coloured photographs with approximately 150 major species of medicinal and edible plants. This is an excellent field guide helping beginners to easily identify plants. It also includes collecting techniques and definitions.

Mushrooms of the Boreal Forest.Eugene F. Bossenmaier. University of Extension Press: University of Saskatchewan. 1997. Coil bound, Index, Table of Contents, Glossary. 105 pages.

This is an excellent book written for anyone whom would like to learn about mushrooms in the boreal forest. There are more than 200 distinctive mushrooms with coloured photographs and descriptions. It identifies the edible mushrooms as well as poisonous ones. Other information includes where to find them, ecology of wild mushrooms and the book is arranged by major mushroom groups for easy identification.

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APPENDIX

IV.

Canoeing

APPENDIX

Canoeing

Canoeing and Junior Forest Wardens

No book or amount of written materials about canoeing will take the place of first hand experiences in a canoe. If you are a leader with limited skills, contact the Alberta Recreational Canoeing Association for information about some personal or group lessons. A short course may give you the confidence to teach basic canoeing on flatwater. A basic course will also teach you how to enter and exit a canoe properly, how to paddle with a partner, and basic maneuvering skills such as how to keep the canoe going straight and how to make turns.

Canoeing is a peaceful way to travel in backcountry. It will give Wardens an appreciation of the explorers and traders who ventured through some of Canada's wildest and longest rivers. No matter what technology contributes to the materials that the canoe is made of, it is basically the same boat it was hundreds of years ago and will remain so for many more years to come.

Basic Canoe Types

There are four general categories that may help you understand the differences between canoes:

1. Recreational - designed for easy river and flatwater trips.
2. Expedition - Designed for extended wilderness trips. Also called touring canoes. They are very stable and have a good carrying capacity.
3. Slalom - Designed for whitewater and are exceptionally maneuverable. They are short, with round bottoms.
4. Marathon - Designed for racing. They are long and narrow and easier for tip over to a novice paddler. They have a straight keel which makes them track effectively but difficult to turn.

Canoe Materials

Most boats manufactured are made of plastic, composite, aluminum or wood.

Plastics - Not all plastics are alike. Molded polyethylene can be molded into complex shapes. These canoes are inexpensive, durable and slip easily over rocks. Royalex is a foam core sandwiched between sheets of ABS (acrylonitrile butadiene styrene) with layers of vinyl on top. It's extremely tough and a good choice for whitewater and recreational canoes. These canoes require little maintenance and are moderately priced.

Composites - These canoes are made by fitting layers of cloth like fiberglass into a mold and adding resin to create a stiff, tough shell. The most durable is Kevlar. Kevlar weighs 25 percent less than fiberglass. Composite canoe hulls have a gel-coat resin as the outer layer which protects the fabric from UV rays but can add up to five kilograms to the weight.

Aluminum - Aluminum canoes offer no maintenance, light-weight, low cost and remarkable durability. There are a few drawbacks, however, they stick when scraping over rocks, radiate heat and cold, are noisy and lack aesthetics.

Wood and Canvas - Canvas is stretched over a cedar planked hull. The outside of the hull has several coats of a watertight finish. They are beautiful to behold but require love and care, frequent maintenance and are expensive.

All Wood - Similar to wood and canvas without the canvas. The inside and outside of the hull are finished with fiberglass and resin. Often called "strippers" because of the look of the long planks of the hull. They are expensive, attractive and not as durable as plastics or composites.

Other Materials - Folding canoes have a coated nylon or canvas stretched over a wooden or aluminum frame. When disassembled a canoe can fit into two or three duffel bags. Inflatable canoes may seem out of place but their compactness and portability is a big advantage. They are harder to paddle than hardshell boats and perform the best on rivers with a current.

Accessories

Standard paddling gear consists of a paddle, life jacket, painters on the canoe, and a bailer.

Paddles - Paddles come in as many designs as canoes. Choose a design to suit the kind of canoeing you will be doing.

Some features to consider are blades, grips materials, and size. Blades can be shaped like a square tip for whitewater, a beavertail or round-tipped or tulip. Large paddles move more water but a smaller blade is good for flat water and wind. Grips are important because that is where a paddle has control over the paddle. There are T-shaped and pear-shaped grips. T-shaped grips are good for whitewater while the pear-shaped is comfortable for recreational canoeing. The materials used for paddles are wood or synthetics. Wooden paddles are more flexible than synthetic materials, require more care and are expensive. Sitka spruce, western red cedar and ash are common materials covered with a protective layer of fiberglass.

Life Jacket - For your personal safety a life jacket is essential and will provide years of protection. Each person is required to have a personal flotation device (PFD). When choosing a PFD, choose safety over comfort. The amount of flotation each person requires in a life jacket depends on their own personal flotation, experience and the kind of whitewater canoed. There should be enough straps and snaps to secure the jacket firmly around the body. Add a plastic whistle to the zipper as an added safety device, which can be used to get the attention of other paddlers.

Painters - Painters are short ropes attached to the bow and stern of the canoe. They are used to tie the canoe to a dock, tow another canoe or walk a canoe through rapids. The lengths can vary from three to eight metres.

Bailer - A bailer is legally required by small craft safety regulations for the simple reason that it is an important safety tool. A bailer allows you to keep the bottom of the canoe empty of water without having to go ashore to empty the boat. An empty bleach bottle with the bottom cut off is a simple and effective bailer. Don't forget to permanently glue the top onto the bottle.

Make a Bailer For Your Boat

The law requires that each small craft needs to have the following items in the boat: an approved life jacket for every person in the boat, a spare paddle, a bailer and a line attached to the canoe called the painter. You can easily make a bailer and keep with your equipment so it's ready to go in the boat with you.

Materials required:

- empty bleach or vinegar plastic bottle with screw on lid, cleaned
- sharp straight razor-edge
- marker

1. Use the marker and draw a line around the jug about 5 cm from the bottom, up the middle, along the ridge below the handle and back down to the line at the bottom.

2. Hold the jug by the handle and carefully cut along the line.

3. Make sure the lid is securely fastened on the jug.

Keep the bailer handy in one place in the boat. You may use a long cord and tie to the thwart in the canoe. If the canoe goes over the bailer will not sink out of sight. When it's time to bail, scoop the water up and dump overboard.

Safety

Until you have been there, it is difficult to imagine the force of a river pounding down on a boat out of control. Most accidents can be prevented with a little foresight and a healthy attitude of caution.

Personal Preparation

Trip leaders have a large repertoire of responsibilities which includes:

- detailed information about the trip which matches with the abilities of group members, maps, guidebook,
- gear: PFDs, rescue rope, first-aid kit, repair materials, spare paddles, and survival equipment.
- trip plan to appropriate authorities
- names and phone numbers of contacts in case of emergency

Group Travel

Never boat alone and travel in groups of two or more canoes for greater safety. As a group there should be a common understanding of safety procedures. Some are listed below:

- A set of hand and paddle signals is used for communicating from boat to boat. For example, a waved hand or paddle means help, a vertically outstretched hand or paddle means all clear, a horizontally outstretched hand or paddle means stop.
- Procedures for rescue of others
- Expectations for self-rescues
- Freeing a pinned and wrapped boat
- Emergency procedures
- Signs of Hypothermia in others
- Getting help
- Emergency contacts

Equipment

On canoe trips, ensure all equipment is in working order and that safety equipment is adequate.

- PFD - every person should have their own personal flotation device
- Bailer for each canoe
- Spare Paddle for each canoe
- Rescue Lines - Plenty of rope (at least 15 metres) is essential in case of rescues. Throw lines are made specifically for boaters and are excellent because the bag floats and can easily be thrown.
- First Aid Kit - A complete first aid kit in a water-tight container is essential, especially for longer trips.
- Repair Kit - Should include repair materials for canoe, paddles, stove and other equipment.

- Helmets - helmets are not required on easy water but can save a paddler's life on rough whitewater.

Skill Level and Whitewater

Whitewater rivers and individual rapids are rated according to their degree of difficulty. A plus or minus sign is sometimes used to further refine the rating, for example Class III+ or Class IV-. Keep in mind that these ratings are subject to change because of rising water, which can increase or decrease the difficulty. Most rapids, however, are more difficult with a rise in water because the current gets faster and has a greater force.

Rating Scale of Whitewater Difficulty

Class I

Beginner - Very easy; waves are small; passages clear; obstacles are easy to spot well in advance and avoid.

Class II

Novice - Small and regular waves; good for beginners.

Class III

Intermediate - Numerous waves; large enough to cover the boat; some maneuvering required. Rocks and eddies present; scouting may be necessary to determine spots for maneuvering through narrow spots.

Class IV

Advanced - Difficult rapids; precise maneuvering required; long stretches of violent currents; high and irregular waves; scouting is mandatory the first time due to risk of overturning or wrapping boat and long swims for paddlers; for skilled boaters.

Class V

Expert - Extremely difficult, long and very violent rapids, following each other almost without interruption; riverbed extremely obstructed; big drops; violent currents; very steep gradient. Scouting is mandatory but often difficult. A great risk of boat damage and serious injury to paddlers and for teams of experts with excellent equipment.

Class VI

Extreme - Extraordinarily difficult; extremes of navigability; nearly impossible and very dangerous.

Canoe Games

Games make the learning of technical skills more fun and exciting. Safety can also be part of the fun.

Shipwreck

This game is similar to the game Shipwreck played in a gymnasium. Use four buoys and make a rectangular playing field. The playing field must be large enough for the number of canoes to move, especially when the group's skills are good. Identify the four sides of the field using canoe terms: bow (front of boat) , stern (back end of boat) , port (left side) and starboard (right side.) All canoes are inside the field. One person calls out a direction and the paddlers have to paddle as fast as possible over that end of the rectangle. Note: Make sure the rectangle field has no objects on the other side that canoes may run into. Keep all canoes in the game, even the last one over the line. The last canoe over the line makes the next call.

Below are some other skills to call out in the game:

- Buddy Up! Two canoes have to get side by side but facing in opposite directions. This will help paddlers learn to pivot the canoe.
- Person Overboard! Paddlers have to jump out of the canoe and get back in without flipping the canoe over.
- Shark Attack! Canoes have to make small pontoons of three or four canoes side-by-side to have safety from the shark. The last boat not attached makes the next call.
- Octopus! Paddlers have to lie on their backs on the bottom of the canoes and wave their arms and legs in the air like an octopus waving tentacles. This teaches balance and about the low centre-of-gravity in the canoe.

Checklists

Daytrips

Canoe
Paddle
PFD with whistle
Helmet
Throw rope
Duct tape/repair kit
Small first-aid kit
Bailer
Lunch
Water Bottle
Sunscreen
Spare clothing in waterproof bag
Waterproof bag
Rescue gear
River clothing suitable for conditions
Footgear
Camera
Map, guidebook
Matches, fire starter
Toilet paper
Wallet and keys

Overnight Trips

Canoe
Paddle and spare
PFD with whistle
Helmet
Throw rope
Full repair kit
Full first-aid kit
Bailer
Water bottle
Sunscreen
River clothing suitable for conditions
Footgear
Camp clothing
Camp shoes
Wallet and keys
Carabiner or pulleys for rescues
Waterproof bags
Tent or bivy shelter
Sleeping bag
Sleeping pad
Food
Cook wear and kitchen gear
Camp stove
Fuel
Flashlight
Emergency supplies (space blanket)
Water containers
Firepan
Map, guidebook
Toilet paper
Plastic trowel/folding shovel
Insect repellent
Garbage bags
Signalling devices
Camera
Fishing gear
Personal toiletries

Supporting Resources

Associations

Alberta Recreational Canoeing Association (ARCA)
c/o Calgary Outdoor Area Council
1111 Memorial Drive NW
Calgary, Alberta
T2N 3E4
Tel: 270-2262

Books

Canoe & Kayak Techniques: Canoeing. Edited by Dave Harrison. Stackpole Books: Mechanicsburg, PA. 1998. ISBN 0-8117-2722-X (pbk.) 60 pages, Table of Contents.

A great little book with 29 articles. Each article focuses on a particular paddle stroke, boat-handling or river-reading skill. Detailed descriptions and schematic drawings show exactly how each maneuver is done. Also includes braces, ferries, rolls and eddy turns, reading the water, rescue techniques, righting a capsized boat, how to portage.

Paddling Basics: Canoeing Cecil Kuhne. Stackpole Books: Mechanicsburg, PA. 1998. ISBN 0-8117-2881-1 (pbk.) 150 pages, Table of Contents and Glossary.

This is an illustrated guide to equipment, technique, navigation and safety. It contains information about canoes, accessories, basic strokes, advanced strokes, reading currents, tackling hazards, safety and overnight trips.

Web Sites Worth Paddling To

The Wooden Canoe Heritage Association
http://www.wcha.org/

American Canoe Association
http://www.aca-paddler.org/

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APPENDIX

V

Hiking & Backpacking

Adventurers
JUNIOR FOREST WARDENS

APPENDIX

Hiking & Backpacking

If you walk for a day, you can say you went hiking. If you carry all your supplies into the wilderness and spend the night, you can say you went backpacking.

Hiking and backpacking are minimalist sports that provide a wonderful escape from busy lives and almost anyone can do it. Walking is about as low-tech as you can get. Equipment, however, has gone high tech while appearing deceptively simple.

Equipment Needs

Deciding what gear will suit your needs can be a challenge and shopping can be overwhelming. The best way to know if you like a piece of equipment is to use it and test it before you buy it. Some outdoor fitters and university outdoor education clubs will rent gear for a minimal price. This is an excellent way to experiment with different brands and styles before you shell out money for your own equipment.

Some of your equipment needs may include:

- Footwear
- Backpack
- Tent
- Sleeping bag
- Sleeping pad
- Clothing (Information about dressing in layers is contained within the program)

Footwear

When you are on the trail, fully loaded, the wrong footwear can result in discomfort, injury, or inability to participate in some activities. There are many uses for outdoor footwear so it is important to make an informed decision when it comes to boots. Choose a boot for the activity you will do most of the time; some of the functions of different boots overlap.

- **Approach Shoes** - These shoes are for the approaches to various wilderness activities such as rock climbing, paddling, trail running or fast hiking. The emphasis is on lightness with a specific sole for the activity.
- **Day Hiking Shoes and Boots** - These are for short, easy hikes on a trail with a light load. The emphasis is on lightness, comfort and moderate support.

- **Hiking Boots** - These boots are for two to three day hikes on trails or aggressive off-trail day hiking. The emphasis is on lightness, comfort, durability, water resistance and support.
- **Backpacking Boots** - These boots are for long distance self-supporting hikes, on and off trails or light mountaineering. Emphasis is on control, long term support, water resistance and the boots' ability to withstand abuse.
- **Mountaineering Boots** - These boots are for mountaineering, glacier travel or aggressive backcountry travel. The boots are compatible with clip-on crampons, are stiff and durable.

Boot Features That Affect Choice

Some of the components that play an important role in boot design are listed below.

Upper Materials

The upper portion of a boot conforms to the upper part of the foot and is where the boot is fastened and tightened. Uppers can be made from full-grain leather, suede (split leather), fabric, plastics or nylon, and waterproof/breathable layers.

Construction

The construction of a boot describes the attachment of the upper to the sole unit.

- External welt is a visible seam where the upper is double-stitched to the insole and midsole. This is a classic construction for heavy-duty boots.
- **Glued construction** - Gluing is done instead of stitching. It is common on approach shoes and dayhiking boots.
- **Injected PU** - This involves mounting the upper on a last, then injecting the polyurethane that forms the band and sole directly into a surrounding mould. This forms a strong and lightweight bond to the leather without the need for glues.

Heel and Toe Counters

These maintain the shape of the boot and give protection from impact. The heel counter helps prevent the heel from lifting. They can be made from fibreboard or a synthetic material.

Lining

Most boots have a lining for comfort. It can be synthetic, leather or synthetic with Gore-Tex or other waterproof/breathable liners.

Lacing

Lacing systems may be one or a combination of the following: eyelets, D-rings, webbing, hooks or gusset.

Parts of the Sole

- **Shank** - the shanks controls the flexibility and rigidity of the sole. The shank can be flexible, medium or stiff.
- **Outer sole or sole** - A sole is available in different compositions of rubber and various patterns, depths, and quantity of lugs (the protrusions on the bottom of the sole.) A deep lug will grip loose surfaces but will be heavy. There is also a specialized design feature available such as sticky rubber for climbing or a flat area under the toe for edging.

Boot Pointers to Ponder

- Day-use on easy terrain will be more comfortable in flexible footwear.
- High-cut boots will give ankle support and protection from impact.
- The heavier the load, the rougher the terrain, and the longer the trip, the more support is needed for your feet. If you have any leg joints prone to injury, more support may be helpful.
- You lift each foot thousands of times on a hike. The rule of toe is that each additional pound on your feet requires the same energy as five pounds in your pack. Choose the lightest footwear that meets your needs.
- High heat and humidity may soak your feet on the inside if they can't breathe through the boot.
- Cold and wet weather, especially snow, requires water-resistance.
- High altitude increases the importance of all the other factors.
- Special tasks may need special designs: scrambling up rocks may require sensitivity, snow travel may need crampons, or steep slopes may need the ability to edge in with the boots.
- Heavy vibram soles last longer than thin and soft 5.10 rubber, especially if used on concrete.
- Some details of construction or materials are not readily apparent from just looking at a boot. If they are not printed on the boot's packaging, you should ask sales staff directly.

Backpacks

Backpacking packs are also called expedition packs with a capacity of 70 to 100 litres. These packs are necessary for long trips. The large capacity in these packs requires that they have a frame to provide the structural rigidity needed to transfer the weight of the load from the back and the shoulders to the hips.

Backpacks have three distinct components: frame, packbag and suspension.

Frame

1. E**xternal Frame** - the ladder-like frame is the heart of the system. Constructed of seamless, aircraft quality aluminum alloy or high-tech composites, the frame is rigid enough to distribute most of the weight to the hips where 80 percent should be carried. External frame packs carry the load high, putting the centre of gravity over the hips. On uneven trails, this pack sways and can cause havoc with balance.

2. **Internal Frame** - An internal frame is not as stiff as external allowing the pack to flex and move with the body. Integrating a frame into the pack allows the pack to be worn closer to the body. There is less ventilation but it keeps the centre of gravity lower and closer to the body.

Packbag

The packbag is where the bulk of the materials will be packed. Zippers, side bags, and places where webbing can be attached are all good features. Evaluate the pack for keeping things dry. Will rain seep through the zipper? Is the zipper sturdy and made of nylon?

Suspension

A pack's suspension system is made up of a hip belt, shoulder straps and some form of back support. When properly adjusted, up to 80 % of the load weight should be on the hips making the hip belt a critical part of the system.

Tents

Three-season tents can be used in the moderate weather of spring, summer and fall while a four-season tent is designed to stand up to the worst possible conditions. They have stronger poles, additional waterproofing and a sturdier design.

The majority of tents have a breathable inner canopy and a separate waterproof fly. This two-walled construction is beneficial in two ways: 1. It moderates the temperature because of the insulating air space between the two walls; and 2. It allows ventilation of body vapour. During the night a person can lose up to a half a litre of water so ventilation is important. If the moisture is not allowed to escape, it will condense inside the tent and get the sleeper and gear wet.

Many tents are free-standing which means they come to life without being pegged down. This is an advantage because the tent can be assembled anywhere and then plopped down in the best site.

Desirable Features

Some of the things to look for in a tent will vary depending on where and how it will be used, how many people should it hold, weight, and cost. Some of a tents features include:

- **tent body** - The tent floor should be tough and waterproof up to 15 cm of the tent walls. The tent body should be made of non-waterproof fabric (taffeta or ripstop nylon.) Seam construction can be in two types: bound or lap felled. Good quality tents have lap felled seams where the two pieces of fabric are placed on top of each other, folded and stitched. Bound seams are weaker and are made stitching through a layer of material folded over the two pieces being joined.
- **poles** - Most tent poles have shock cord running down the centre and fixed at both ends. This makes the poles easier to assemble and holding them together. Three materials used to make tent poles are: fibreglass, carbon fibre/composite and aluminum. Aluminum is the most common and comes in a variety of qualities made from different alloys: the strongest is 7000 series, followed by 6000 and 2000 series. Carbon fibre/composite is expensive, light and strong. Fibreglass is cheap, heavy and prone to breaking.

- **fly** - The fly is the most exposed part of the tent to the elements. The fly must be made of waterproof material.
- **vestibule** - A separate extension added to the tent which is like a porch. It is useful for storing gear and taking off dirty boots outside of the sleeping area.
- **stakes/pegs** - Aluminum stakes are light and about 23 cm (9 inches) long. Carry separately in a stuff sack to protect the tent from punctures.
- **zippers** - There are usually the first thing to go on a tent. Look for a nylon coil zipper, it's light and less likely to stick than a metal zipper.
- **windows** - Windows should have zip closed flaps and bug netting to let the air circulate.

Before you buy a tent, set it up. Take it down and re-assemble if it is already up on the store's floor. This is the best way to judge how easy or difficult it is to pitch. Could you do it in the dark?

Also look for any tight or difficult zippers that could break later. Lie down inside the tent and imagine how many people can be comfortable sleeping there. Short ones, tall ones, skinny ones big ones plus gear.

Look at the outside of the tent to determine how strong it is. Push on the walls from different angles and directions to make sure it won't collapse or bend too easily. The canopy and fly should be taunt, otherwise breathability, water repellency and stability are compromised.

Sleeping Bags

Buying a sleeping bag is not a simple purchase. Consider the kind of fill, comfort rating, shape and construction and weight and compatibility. First, consider the conditions you expect to encounter. Sleeping bags have four comfort ratings:

- summer weight (above freezing)
- 3-season (as low as -10°C)
- 4-season (15° to -20° C)
- winter/extreme (as low as -40°C)

The fill in is a sleeping bag creates thousands of small dead air pockets. These pockets trap warmth generated by your body.

Down is an excellent insulator and nothing beats the warmth to weight ratio, compressibility or luxurious feel of a good down bag. The quality of down is measured by fill power, for example one ounce of 550 fill has a volume of 550 cubic inches when fully lofted. The major drawback with down is that it loses most of its insulating power when wet and air drying takes a long time.

Synthetic fills are made of small diameter polymer fibres. Quality bags will contain respected brand names such as Hollofil II, Polarguard HV (high void) or Lite Loft. A synthetic bag is less expensive than down, but not as light or as compressible. A synthetic bag will dry quickly and will still keep some of its lofting and warmth when wet.

The **outer shell** of the sleeping bag must serve three critical functions: Hold insulation in place,

create an effective wind block and allow internal moisture from perspiration to escape. Ripstop or taffeta nylon are frequently used because of their light weight and tight weave. For comfort, the inner lining must be soft, breathable and be able to wick moisture away from your body. To prevent the outer shell and inner lining of the bag from touching which can be a potential cold spot, sheets or batts of fill should be overlapped so that each stitch is backed up by one or more layers of insulation. In a down bag, baffles are constructed to keep the loose fill in place. The baffles are like channels filled with down made by sewing mesh fabric to the shell and the lining.

There are four basic bag shapes: mummy, modified mummy, barrel and rectangular. A close fitting bag will have a higher thermal efficiency than a roomier one even if they have the same amount of loft.

Features of a Sleeping Bag

- **Hoods** - should be contoured worth lots of insulation.
- **Yokes** - keep warm air from being forced out around your neck whenever there is movement in the bag.
- **Foot boxes** - should allow room for your feet to rest naturally without compressing insulation. There should be extra insulation here.
- **Draft tubes** - should run the entire length of the zipper to prevent cold spots. It is best when they are sewn to the inner lining and to the outer shell.
- **Zipper** - should be made of nylon and be light, easy running. Nylon coil zippers are less likely to snag fabric and conduct less heat than a metal sipper.

Sleeping Pads

A good sleeping pad can make the difference of a good rest or one where every bone feels every bump. You can actually lose more heat to the ground than to the air around you if you do not have anything underneath your body. There are two types of sleeping pads: closed-cell foam and a self-inflating mattress with an open-cell foam. At the turn of a valve, the mattress pad inflates to about four cm thick.

Type of Sleeping pad	Advantages	Disadvantages
Self-inflating	Twice the insulating value Much more comfortable Less bulky to carry	Two to three time heavier More expensive ($35 - 80) Can be punctured • (bring repair kit)
Close-celled Foam	Lighter Less expensive ($10 - 20) Virtually indestructible	Not as insulating Not as comfortable Bulkier

Hiking is just like any other sport. It is important to warm up and stretch the muscles before using them. This is to help prevent stress and injury Take five minutes and try some simple stretches. Do some squats, quadriceps and hamstrings stretch, and calf and Achilles stretches.

The History of Walking Sticks

A walking stick or staff is a basic tool for the outdoor traveller. For thousands of years, the walking stick has been a symbol, weapon, measure and support for tired feet and legs of the wanderer. It has a hundred uses.

For centuries, labourers used the staff to support loads and defend themselves. Egyptian hieroglyphics picture travellers with sticks in hand. The Bible is full of references to staffs. The ancient Druids, who believed every corpse has its own living spirit, apologized to a tree before cutting it for a staff.

The staff is also a symbol of authority and power. Moses used his to part the sea and to get water from a rock. In Egypt, the staff and the shorter rod were the Pharaoh's symbols of office. Today, the mace, an ornate version of the staff, symbolizes power in Parliament. The staff, especially a staff with a crock, has always represented the humble shepherd.

Record keeping is one of the oldest uses of the staff. The ancient Norse used a notched stick called a skor to keep track of the numerical information. Some native Americans carried coup (pronounced coo) sticks decorated with carvings and feathers to commemorate victories in battle. In Europe, every town and tourist attraction sells metal crests to tack onto a walking stick.

A walking stick for Wardens can be used to record achievements and will be a treasured companion. Some people find that when they travel without it, they want it. And for the people who know of its uses and benefits, the walking stick is as essential as a sleeping bag or a pair of boots.

Why Carry a Walking Stick?

- It will help keep your balance while crossing creeks, stream and rivers, traversing hillsides, crossing shale and scree, carrying heavy loads, and resting en route.
- It will help you maneuver while crossing downed trees over trails and to break or prevent a fall.
- It will reduce stress on your back, knees, legs and feet, provides extra power and balance going uphill, reduces shock on knees going downhills, and takes pressure off back and hips (mainly uphill.)
- Keeping in touch with the group in the dark by walking single file catching hold of the end of the next Warden's stick.

- Other uses: use as a center or side pole for a tarp; to prop up your pack; to lean on while resting; pushing aside spider webs and brush; self defense; held horizontally it can become a step; keeping back a crowd; testing the depth of a river; makes a stretcher.

Making a Hiking Stick

A walking stick can be made from almost any type of wood. Green wood is not suitable and good conservation practices mean never cutting down a living tree. Hardwoods such as ash, oak and maple are good choices. Diamond willow and saskatoon are popular. Poplar, aspen and birch are all right but a bit heavy. Conifer saplings are usually straight, light and strong.

You may use whatever you can find in your area. Choose standing deadfall that is straight and free from splits with the bark firmly attached. It isn't necessary to remove the bark but the handgrip should be smooth. If you decide to remove all the bark with a draw knife or a pocket knife.

The length of your walking stick is pretty much a matter of taste. Some people like a short, light stick just above waist height. While others choose one about chin height.

The staff needs to be thick enough to be strong, thin enough to be light, and comfortable to carry. A pole three to four cm in diameter at the base and four to five at the butt (thick end) is an ideal size. Some carry the butt end up for a preferred balance, while some prefer the butt down, and others whittle the butt so the staff is a uniform diameter the whole length.

You can protect the lower end with a metal ferrule to reduce the wear. A short piece of iron pipe works well. Carve the bottom of the staff until it is barely too big to fit the pipe then heat the pipe with a torch or boiling water. Use gloves to handle the hot pipe and drive it firmly over the end of the staff. It will grip tightly when it cools. If that doesn't work, drive in a wedge or glue on with epoxy cement. A rubber cane or crutch tip may be glued on.

You may also apply an outdoor varnish or occasionally a coat of stain or oil. Raw wood will take on a beautiful sheen from perspiration.

Planning

When planning overnight and day hiking trips with your group, discuss the advantages and disadvantages of group size. Consider how many leaders are available, familiarity with the area being visited, and experience of group members.

Travel	Pros	Cons
Travelling as One Large Group	Can be a positive group building experience Keeps equipment and human resources close at hand Minimizes anyone getting lost. Good for groups with little experience	Increase in noise impact. Requires adjustment to a common pace. Can compromise a pristine area where low impact travel is necessary.
Splitting into Smaller Groups	Reduce impact. Each group has its own equipment and human resources. Small groups can be formed by a common pace.	Each group will need more equipment such as maps, compasses, first aid kits. Each group needs a higher level of backcountry skills. Need to establish a rendezvous and a definitive backup plan in case groups get separated.
Travelling Alone	Unique wilderness experience Reduces impact.	No other human resources are immediately available if an emergency arises. May need more equipment, i.e. map and compass. Individual must have backcountry skills.

Conserving Energy

It is extremely important to pace yourself and conserve energy. Every day you should examine your route and identify difficult stretches, estimate travel time and schedule rest stops. A good schedule is about five minutes of rest for every hour of hiking. Compare the estimates you made yesterday. And if necessary, consider rethinking your route. Check the less experienced hikers to see how they are doing. The hike may need some adjusting to account for their pace. If the group gets too spread out, Wardens may miss trail junctions and turns. Ensure the faster hikers are sensitive to the slower pace and will adjust themselves to accommodate the group.

Walking Uphill

The best position to be in going up a steep incline is standing straight and keeping steps small so you can easily recover if you lose your balance.

Walking Downhill

Walking downhill can be hazardous and strenuous. Lace you boots up firmly, take small controlled steps and keep the knees bent slightly to absorb the shock. Try to avoid the toes smashing repeatedly into the front of the boot.

Rest Step

A rest step will rest the leg muscles and is easily done by briefly locking the knee when the weight is shifted to the leg. The locked knee causes the body weight to be supported by the skeletal system.

Rhythmic Breathing

Your hiking pace should allow you to breathe comfortably and be able to talk. You are hiking too fast if you cannot keep up a conversation and are gasping for breath. Synchronize the rhythm of your walking with your breathing. Your pace can be adjusted as you climb steeper terrain so your breathing remains controlled.

Dayhikes

Water

Often hikers don't take enough water. Two litres per person per day is a good rule of thumb. It may vary depending on the length of the hike, the weather and the hiker's level of fitness.

Food

On a day hike, bring foods which are high energy, packable and nutritious. For example, chewy bread, hard meats like salami, chocolate, sturdy fruit such as oranges. Do not discard biodegradable items such as apple cores or banana peels. The back country rule is pack out what you pack in.

Crossing Streams

- The most experienced person should cross first to find the best route.
- Waterproof hiking boots should be kept on when crossing a stream. Do not cross barefooted.
- Always face upstream when you cross moving water.
- Check the depth carefully as you cross and use a stick for better balance.
- Exercise caution if you are using a log as a bridge. Those who are less confident should straddle the log and inch their way across. Sure-footed hikers should carry the packs across one at a time.
- Crossing with a rope - Securely anchor one end near the shoreline 1.5 to 2 metres above the river. The first person to cross holds the rope (never tie around the body) and anchors that end to trees or rocks above the river to create a hand line. The last person over crosses like the first person, taking the rope along.
- Crossing without a rope can be done in a variety of ways.
  - **Triangle Method** - Each person faces inwards and links arms at the shoulders, feet are spread apart. The triangle rotates as each person takes a turn at being the stationary, down stream anchor.
  - **Line Astern Method** - Three or more people form a line facing upstream. The upstream person moves across first and stops and then number two moves and so on. If the current is really strong, the line moves together at the same time.
  - **Line Abreast Method** - The whole group forms a line by linking arms, facing the opposite bank and the group walks across together.
  - **Paired Crossing Method** - Two people face each other and link arms. One acts as the upstream water break. The upstream person moves first, stops and the downstream person moves into the eddy created by the water break of the first person.

Travel Tips While Hiking

- Establish a steady, rhythmic pace while hiking.
- While travelling in groups, do not get ahead of the leader or fall too far behind. The slowest moving person should be behind the leader and everyone should follow that pace.
- Conserve energy by not swinging arms unnecessarily.
- Look for level foot placements.
- Ascending 400 metres an hour is a good pace. If you are in good physical condition, ascending at 600 metres an hour may be expected.
- Place the whole foot on the ground rather than just a toe. The upward thrust then comes from the thigh and stomach muscles rather than the calf.
- Take short steps on unsure ground.
- When passing or crossing obstacles, pause long enough to keep the group together.
- Do not crowd the person in front of you. This invites injury from branches snapping back.
- Inform the leader of any problems with equipment. The group should keep together while adjustments are made.

- Develop the habit of looking in all directions around you. Don't hike looking at the toes of your boots and the patch of ground a few metres ahead of you. Look behind after every few hundred metres of travel. Frequently scan the skyline and the distance of visual penetration into the bush. When you enter a clearing, scan the perimeter. You may see a bear in time. Scanning helps you become familiar with the surroundings and helps you maintain your orientation. This also helps you feel more secure on your return journey..
- Short frequent rests are better than infrequent long ones.
- When you feel a hotspot on your foot (the early sign of a blister), stop immediately and apply first aid. This will save you from a serious problem later on.

Backpack Packing Checklist (Essentials)

Back pack

Pack rain cover

Clothing

Boots

Socks

Underwear

Shorts

Long pants

Synthetic knit top

Synthetic knit bottom

Short-sleeved/long-sleeved shirts

Pullover sweater

Jacket/parka/windbreaker

Rain gear (poncho, rain pants)

Gaiters

Sun hat/visor

Gloves/mittens

Warm hat

Sleeping Equipment

Tent with fly, poles, pegs

Ground sheet/space blanket

Sleeping bag (in stuff sack with plastic bag)

Sleeping pad

Food

_____ Breakfasts

_____ Lunches

_____ Dinners

Condiments

Hot drinks

Emergency food

Cooking Equipment

Water bottles

Water purification tablets

Stove

Fuel bottle(s) full

Funnel for pouring fuel

Windshield for stove

Cooking pots

Frying pan

Cup

Plate/bowl

Spoon

Waterproof matches

Water filter

Can opener

Dish scrubber

Other Essentials

First-aid kit

Foot care items

Maps

Compass

Flashlight

Spare batteries and bulb

Repair Kit (pack, tent, stove)

Sunglasses

Sunscreen

Lip Balm

Insect repellent

Nylon rope

Pocket knife

Toilet paper

Plastic trowel

Pen and paper

Plastic bags

Candle/fire starter

Whistle/signal mirror/flares

Biodegradable soap

Toothbrush and toothpaste

Bandannas
Scissors
Watch

Miscellaneous

Walking stick/ski pole
Guidebook or copies of pages
Comb
Field Guides
Paperback book
Thermometer
Swimsuit
Towel
Washcloth
Camp shoes
Binoculars
Magnifying glass
Photography equipment
Playing cards/games
Dirty water container
Spare prescription glasses

Day Trips

snacks
sandwiches
water (4 litres per day, minimum)
First Aid Kit
Toilet paper/tissues
Insect repellent
topographical maps
pencil
hat
ziplock bags
compass
watch
sunscreen
rain gear
whistle
hiking boots
appropriate clothing
matches/lighter
moleskin

Overnight

tent
ground sheet
stove
fuel
cutlery
pots, pans
sleeping bag
sleeping mat
water bottles
water (4 litres per day, minimum)
water filter/purification tablets
First-aid kit
toilet paper
insect repellent
topographical maps
pencil
biodegradable soap
flashlight/candle lantern/extra batteries
hat
camp shoes (sneakers)
sunglasses
hiking socks
zip lock bags
toothbrush
toothpaste
signal mirror
rope (15 metre length)
compass
watch
sunscreen
food
snacks/energy food (power bars)
rain gear
whistle
hiking boots
tarpaulin
appropriate clothing
garbage bags
matches/lighter
towel
portable bladder shower
moleskin

Supporting Resources

Books

The Backpacker's Field Manual: A Comprehensive Guide to Mastering Backcountry Skills. Rick Curtis. Three Rivers Press. New York, New York: 1998. 374 pages ISBN 0-517-88783-5. Cost $21.00

This is a great book full of comprehensive information about trip planning, equipment, cooking, nutrition, first aid, navigation, wilderness travel safety, no trace hiking and camping, hygiene and water purification, and weather.

Hiking and Backpacking. Eric Seaborg and Ellen Dudley. From the Outdoor Pursuits series. Human Kinetics Publishers, Inc.: Champaign, Illinois. 1994. ISBN 0-87322-506-6. 146 pages. Table of Contents, Index, Glossary.

This is a handy book; covers such topics as equipment needs for hiking and backpacking, water treatment, what to wear, minimizing impact, breaking in boots, planning a trip, packing a pack, picking a campsite, safety skills, the best places to hike, long distance trips, off-trail travel and much more.

Web Sites Worth Exploring

Hiking Resources
http://www.campfirefoods.com/links.html

Ultralightweight Backpacking
http://ourworld.compuserve.com/homepages/rwgross/ultrahow.html

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APPENDIX

VI

Snowshoeing

APPENDIX

Snowshoeing

Snowshoes, a North American Indian invention, allow you to "float" on snow. Traditional snowshoes have wooden frames and are beautifully crafted. White ash frames and rawhide lacing are traditional materials. The maneuverable bear-paw is the most popular style of snowshoe The elongated Algonquin (also called Maine, Michigan, or beavertail) and the Athabaskan are better when heavy loads are carried.

Ever-improving technology has increased the materials and designs and now there are enough types to suit everyone's taste and needs. The rule to remember when choosing the best snowshoe is to choose the smallest and lightest weight snowshoe that will give you the necessary flotation. Most new snowshoes are made of high-quality light durable, aircraft aluminum. Instead of rawhide lattice, the deckings are made of rubber and other "high-tech" materials. Lifetime warranties are usually assured because if their durability.

Anatomy of a Snowshoe

There are five parts to most snowshoes: the frame, binding system, pivot system, crampons or claws, and decking. When it comes time for your club to purchase snowshoes, rent some first and try out various designs.

Frames

Either wood or metal (usually aircraft aluminum); this is the structural foundation of the "shoe" which defines its shape and size. There are three basic sizes: short-oval, medium-wide, and long-narrow.

Bindings

Traditional snowshoes are held on the foot by a rawhide harness in either an "A" or "H" shaped binding. The advanced sport bindings now work in coordination with the pivot system. Bindings should have a solid landing platform and a secure connection between the foot and the snowshoe. Whatever the design, the bindings should be easy to use, have little sideways and forwards motion, have no pressure across the foot, fit all sizes of boots, have a quick release and proper heel positioning.

Pivot Systems

The pivot is a highly stressed point on the snowshoe and must withstand a lot of weight and at the same time the rotational forces of walking. Snowshoes can have a stationary pivot system (snowshoe doesn't allow the snow to drop away from the foot as foot pushes) or a rotational pivot system (tail drops and front of snowshoe rises.)

Decking

The decking is the material within the frame, which enables the "shoe" to "float" on the snow. It can either be made of lace or solid material like Hypalon, a rubberized synthetic material. Continuous decking material in sport snowshoes allows people to now use a smaller snowshoe, get more flotation than traditional designs. For example, a 25 cm X 91 cm traditional wedded shoe may hold a 91 kg carrying weight. A sport snowshoe 20 cm X 61 cm will provide the same if not better flotation and it's half the snowshoe weight.

Crampons and Claws

Many snowshoes come equipped with both toe and heel crampon-type claws for traction on icy surfaces, especially slopes and hard snow. Sport snowshoes have either crampons or claws. Crampons are attached to the pivot rod and provide much-needed traction with their "points." Claws are used on racing snowshoes or where conditions are a few steep slopes and little ice.

Other Equipment

Boots

Waterproof hiking boots (preferably leather) work well with snowshoes. Your goal is to keep your feet dry, warm and comfortable.

Gaiters

Gaiters cover the ankle, instep and lower leg and are made of water-repellent fabrics. They come in two lengths: long (go to just below the knee) and short (go about 5 cm over top of boot.)

Snow Poles

Poles are critical to help keep you safety balanced while travelling forward as well as when doing tricky maneuvers. The poles also help to propel you forward. Poles that telescope into two or three sections are preferable because: they pack down to fit into a backpack; they can be adjusted to your height; they can be adjusted to suit the terrain, for example, short for going up hills.

Size of Snowshoes

Sizing snowshoes is relative to your weight plus the weight of your pack, the type of snow you're travelling on, and what and where your recreation is.

Myth: The more you weigh, the bigger the shoe must be in order to keep you afloat. The key factor is the amount of moisture in the snow. In dry, powdery snow everyone sinks no matter what size the snowshoes are. Sport snowshoes with rubber decking can decrease the size of the show size compared with a traditional snowshoe.

Light, dry snow requires a bigger shoe to keep you from sinking. Heavy wet snow, a smaller shoe with excellent traction.

If your recreation is in steep, mountainous terrain, you need smaller shoes with excellent traction. If you are travelling mainly in open country, you will typically need a larger shoe with a nice tail to provide good flotation and tracking. For running, racing and casual walking, you will probably need smaller, lighter snowshoes.

Basic Maneuvering Skills

If you can walk, you can snowshoe. There is not a long learning curve and it doesn't require a large investment. You can start today and have fun, now! Snowshoeing can accommodate a wise variety of activities such as a hike in the woods, an overnight backpacking trip, or an alpine climb. Snowshoes can take you places where cross-country skis cannot, like thickly wooded areas and steep terrain.

Skills Checklist

With a little practice, Junior Forest Wardens will be able to do the following skills in no time.

Horizontal Moves

- ❍ Striding
- ❍ Stamping
- ❍ Turning
- ❍ Breaking trail
- ❍ Bushwacking
- ❍ Using poles
- ❍ Herringbone stepping
- ❍ Downhilling
- ❍ Jumping

Vertical Moves

- ❍ Rest-stepping
- ❍ Switchbacking
- ❍ Scrambling
- ❍ Side-kicking
- ❍ Kick-stepping
- ❍ Side-stepping

Remember These

You'll do well if you remember these three things.

Never cross tails. You will always fall flat on your face if you step on the back of a fast-moving snowshoe.

Never back up. When you step backwards the tail goes into the snow. Instead, make a U-turn with small steps.

Avoid traversing. Avoid cutting across a slope because snowshoes aren't designed to dig their edges into the snow.

Basic Step

The basic step is made with feet spread no farther apart that as for normal walking. Lift one shoe up and over the other far enough to completely clear the stationary shoe.

When using snowshoes, step out far enough for the forward shoe to clear the edge of the rear shoe. Hesitate between strides to let the snow compact to give you a firm foundation for the next step. As much as possible, walk as you normally walk. It is not necessary to keep the feet wide apart since snowshoes are designed to fit into each other. The knees should be lifted a little higher than normal before moving on the snowshoe ahead, and this will enable it to clear the snowshoe on the ground. In deep snow, the knee lift is increased and must occur before moving the foot forward or you will catch the snow with the tip. In deep snow, try to place the heel down first to keep the tips from becoming loaded with snow.

Running

Running requires a somewhat similar technique to walking, and lifting the knee first is important. This results in a bounding stride with the heel landing first rather than a normal running stride. A normal running action causes the tips to dig into the snow, causing you to trip. Running should only be attempted after you are familiar with the snowshoes, as it is the greatest cause of broken equipment.

Step Turn

The step turn is simply walking in a tight circle. The toes move while the heels stay in the direction of the turn. Tail of the inner snowshoe remains almost stationary while its tip pivots in direction of turn. The outer shoe follows. It looks like stepping around a clock.

Kick Turn

The kick turn is more than a step turn. Lift inside shoe until it is vertical, plant heel, pivot it 180 degrees. Then swing other shoe around in pirouette movement. Poles will help you maintain balance while practicing this turn.

Falling

Move the hips in close to the feet before trying to get up. On a slope, put the snowshoes on the downhill side and horizontal across the slope. A pole, friend's hand, trees, branches are helpful aids to getting on your feet. As a last resort, you can take the snowshoes off to get back on your feet. Be careful, you may sink in deep snow.

Uphill Travel

In deep snow, one can walk straight up gentle to moderate steep hills. For steeper slopes, the following three techniques can be used.

1. Edging

On steep slopes, most snowshoers find they slip downhill in spite of using the traverse. An edging technique with the traverse will reduce slipping. Swing the heel over toward the uphill edge of the snowshoe and tramp down firmly at each step to create a 'step' on the hillside. This should be done particularly with the foot on the uphill side in order to reduce the difference in level between the two snowshoes. On a very steep slope, it is necessary to create a 'step' or 'terrace' for both the uphill and downhill snowshoe.

2. Side Step

In a very narrow steep slope, it may be necessary to use the edging technique to make steps directly up the slope. The use of a pole on the downhill side would be very helpful in this situation.

Downhill Travel

Downhill travel is a good test of whether the bindings are tight enough as the foot will be forced farther into the toe piece. If the toe strap is not tight enough, the foot will slide under the crossbar causing a fall forward.

Lean Backwards - On moderate slopes, lean backwards and try to put pressure on the tails first.

Cords on the Toes - Some snowshoes attach cords on the toes and can pull them with their hands to keep the toes up and force the weight back to the tails of the snowshoes as they descend.

Traverse - On steeper slopes, a downhill traverse reduces the steepness. Edging and the use of poles makes the technique even more effective.

Sliding - On narrow steep slopes, one can slide down by placing one snowshoe in front of the other and sitting on the rear one, however, this gets snow on the clothing, causing the dampness that leads to rapid heat loss and consequent cold to the body.

Crossings

1. Gullies, Ditches, Logs

Care must be taken never to put weight on snowshoes when the tips and tails are only supporting the person or the snowshoe frames will break. Therefore, gullies, ditches and logs must be crossed by side-stepping over them rather than bridging the snowshoe between logs.

2. Frozen Bodies of Water

Extreme care must be taken to ensure the ice is thick enough to support the group. Spread the group out over a large area and do not walk in single file. If the thickness of the ice is questionable, it is safer to take the snowshoes off. To fall through the ice with a pair of snowshoes on makes it extremely difficult to get back onto the ice surface.

Snowshoeing Tips and Techniques

- Always Check Your Gear Before You Go
- Are the snow poles telescoping okay? (A squirt of silicone will help.)
- Are there suspicious cracks in the snowshoe bindings?
- Survival gear and knowledge intact?
- Are you familiar with the terrain? Do you have a map?
- Do you have essential items?
- In case of emergency, make sure someone at home knows where you are.
- Take duct tape for emergency patchwork on snowshoes and poles.

Breaking the Trail

- When you snowshoe with other people take turns leading. It gets tiring breaking the trail.
- Put the energetic person in front for as long as is practical and safe.
- When leading, consider the pace of the slowest member of the group.
- When leading, make the steps short enough so everyone of the group can follow in them.
- When following, try to stay in the leader's footsteps whenever possible. This conserves energy and retains a better trail for those following you.

Take Breaks

Take breaks as necessary to make clothing adjustments. Try to stay dry and avoid chills. Drink water and eat something. Snowshoeing is strenuous and burns off calories and uses up body fluids in the form of perspiration.

Snowshoe Sports and Games

Almost any outdoor sport or game played on foot can, theoretically, be played on snowshoes. Old standards, like baseball or tag, become hilarious comedies with snow or abnormal footgear, increasing the entertainment value without diminishing the competition increases the degree of difficulty. Such diversions can also be terrific training in the art of maneuvering snowshoes for the beginner and experienced user alike. There is no need to dread that first large snowfall in anticipation of weeks spent indoors. Break out the snowshoes and choose up sides.

Some of the more common sports activities are included below. A note of caution: Some of the suggested activities may be hard on the wood and leather snowshoes. Discretion is advised. Beanbags or nerf balls may be substitutes for snowballs in any of the games.

Snowshoe Races

Rules for snowshoe races are the same as for foot races. Four or more persons may team up for cross-country racing or "marching." Points are awarded for placing in heats, one point for first, two for second, three for third, and so on. The lowest score, after all heats, is declared the winner. Spotters or checkers, are extremely important in winter long-distance events to provide immediate aid to fatigued or injured participants. Speed events may include 100, 200, 400, 800 metre races, kilometre, or believe it or not, hurdles 60 cm high and 80 cm wide. For any and all competitive events, the snow must be packed firmly and evenly to provide equal degree of difficulty for all.

A Rough One

A form of field hockey can be played on snowshoes if a coloured ball is used and the playing area is well trampled. The ball should be smaller than a volleyball but larger than a lacrosse ball, about the size of a softball is ideal. Colour the ball so it is easy to see. Helmets may be desirable if the play becomes too fierce. Spills will be the order of the day so any stick swinging near an opponent who is down should be curtailed.

Tracking and Trailing

Select two Wardens to be trail-makers. They need a 10 to 20 minute lead to set their trail. The object is to confuse and test the followers. This can be done by such devices such as blind trails, obstacles, double trails which circle in two directions then merge, walking backwards, walking on a fence or wall or rock outcrop, and swinging from tree to tree. A treasure or some

food may be hidden at the end of the trail.

Arctic Escape Hunt

A person has escaped through the snow and a patrol follows her or his tracks, but when they think they are nearing the hiding place, they advance with great caution because for them, one hit with a snowball means death. The escaped person has to be hit three times before dying. If the escapee has taken refuge up in a tree or any such place, it will be difficult to hit him or her without being hit first. The hunted person has to remain at large for a certain time, one to two hours, and then get safely home without being caught. Feel free to adjust the time to suit your group.

Fox Hunting

Play where there is plenty of fresh, unmarked snow. Two Wardens representing foxes, start from the middle of a field or piece of open ground and five minutes afterward the rest are put on their trail. The two foxes are not allowed to follow any human tracks. If they approach a pathway where other people have been, they must turn off in another direction; but they can walk along the top of walls or use any other ruse they like, such as treading in each other's tracks and then vaulting aside with a staff. Both of them have to be caught by the pursuers for it to count a win. The foxes have to avoid capture for one hour and then get back to the starting point. Feel free to adjust the time to suit your group.

The Dash for the Pole

Two rival parties of Arctic explorers are nearing the Pole. Each has sent out one scout in advance but neither has returned. They know the direction each started in because their tracks can still be seen in the snow. What has really happened is that each has reached the Pole, and each is determined to maintain her or his claim to it so dare not leave the spot. They both purposely left good tracks and signs so that they could be easily followed up if anything happened. These two, one from each patrol, should start from headquarters together and then determine upon the spot to be the pole, each approaching from a different direction.

The two parties of explorers start off together about 15 minutes after the forerunners and each follows up the tracks of its own scout. When the first patrol reaches the spot where the two are waiting for them to take possession; the leader sets up the group flag and the rest prepare snowballs, after laying down their staves in a circle around the flag at a distance of six paces. When the other party arrives they try to capture the staves. The defenders are not allowed to touch their staves but two hits with a snowball will put a person out of action. Each defender killed and each staff taken counts as one point and if the rival gains more than half the possible points, they claim discovery of the Pole. Before the defenders can claim undisputed rights, they must kill all their rivals, by pursuing them, even if only one or two are left. The two forerunners do not take part but act as umpires.

Fox and Geese

Fox and Geese can be played on the same circle as the compass game but preferably before as once this lively game starts, the wheel soon becomes unrecognizable due to the many criss-crossing tracks. In fox and geese, the fox stays in the middle while the geese run around the outside rim and dare the fox to catch them. The fox must catch them between the spokes on the rim, so there can't be too many spokes and enough distance between them to give the fox a chance.

Potatoes, Anyone?

For any kind of fun on snowshoes, why not stage an old-fashioned potato race. A basket is set in the centre of a level snow-covered field or on the surface. On a frozen lake, potatoes, or similar objects, are then laid out at equal intervals in straight lines extending away from the basket in the same way that the spokes radiate outwards from the hub of a wheel. Each snow-shod contestant is assigned to a line of potatoes and stands with the tail of her/his snowshoes to the basket just far enough away from the basket so as not to interfere with other competitors and yet close enough so no one has an advantage at the start. At the word "Go", all contestants run out to the first potato in their lines, pick it up and return to drop it in the basket. The process is continued until the winner has gotten all the potatoes from her/his line into the basket before anyone else. It soon becomes obvious that this game requires great skill in manipulating snowshoes in addition to considerable running ability.

A Hard One

Try the ring race. Here the emphasis is laid on skill in getting into and out of snowshoe harnesses, as well as running on snowshoes and manipulating a ski pole. For this race, the contestants line up about 10 metres behind their snowshoes, which are laid out in pairs in a straight line pointing down the course. Each racer carries a single ski pole and at the starting signal, runs forward, fastens on the snowshoes and then runs ahead along the course.

Halfway down the course, along each racer's track, a ring with an interior diameter of five cm is laid on the snow. Each contestant must pick up the ring on the tip of the ski pole, holding the pole in one hand at the upper end only, and then continue along the course to the end where a pin is set vertically in the snow. This pin should have a diameter only slightly less than the inside of the ring. On arriving at the pin, the racer must deposit the ring over the pin still holding the pole in one hand at the upper end only. After the ring is on the pin, the contestants run back to where they put on their snowshoes, then take them off and run back to the starting point. In such an event, the snowshoe bindings should be of similar style so that one racer does not have an advantage over another.

Games for Winter Outdoors

Most of the following games can be played on snow-covered ground with snowshoes or cross-country skies. Note: they do not need snow or ice to be played. All the games require vigorous activity that will keep the players warm no matter how blustery the day. Since most of them are familiar games, there will usually be one or two in the group who know the rules. As a preliminary for participating in outdoor games, it is important that a few warm-up activities be used.

Red Rover

The players are divided into A and B teams. Players on each team join hands. Someone on Team A calls out, "Red Rover, Red Rover, we call (someone's name from Team B) over." This player dashes across and tries to break through Team A's line. If the player breaks through, he/she is allowed to return to Team B and take along a Team A player. Failing to break through the line, the player must stay on Team A's side. Now Team B has its turn to call someone over from Team A. After a period of play, the team with the most players wins.

Polar Bear

A bear's den is marked off on the ice or snow. In the den is a Caller and a Polar Bear. The Caller sends the Polar Bear out after other bears, which he or she captures by tagging. When the number outside the den is reduced, the caller may send the bears out in couples or in fours and order them to hold hands while chasing other bears. The game continues until all players are caught. Any number can play this game.

Sham Battle

The players divide into two teams, one wearing red armbands, the other wearing green armbands. One team is given two minutes to hide and then the other team starts to look for them. In the battle, the object is to remove the armband from an opponent. After losing the armband, the player is out of the battle. The team that loses its entire arm bands first, loses the battle.

Quick Line-up

The players line up in four lines to form a square. The leader, standing in the middle of the square, tells the group "Regardless of where I roam over the field or where I stop, you, the human square moves with me. The number one line must always face me, the number two line must always be on my left, the number three lines always is at my back, and the number four lines is at my right." The leader moves over the area in any direction, and stops facing in any direction. The side that moves into position and forms its new line fastest after each of the leader's moves scores a point. Five points is the game. This game is still fun without scoring.

Dodge Ball

One team forms a circle, the second team scatters inside the circle. Players on the circle throw a softball and try to hit the players in the circle who may dodge and twist to avoid being hit by the ball but cannot leave the circle. A player hit by the ball is eliminated. The eliminated player joins the circle, throwing the ball. The total time taken to eliminate all the players is noted. The group reforms and the second team makes the circle, while the first team dodges the ball. The winning team is the one whose players are able to avoid the ball for the longest time.

Skirmish

Two teams line up facing each other about 10 metres apart. Players place their caps or sticks on a line just behind them. The game is for each player to guard his/her own object, and to advance and gain possession of an opponent's object and return to base position. If a player is caught after gaining possession of an opponent's object and before reaching base position, the object must be returned to the opponent and the player must go back to his/her base position before setting out on another attack. One point is scored for every object seized from the opponents and successfully brought back to a player's base. The game continues until one team has acquired all objects. Or it may be played for a designated number of minutes, with the team holding the most objects at the end of the time is declared the winner.

Crown and Cranes

A centre line and two safety lines are marked. Midway between the centre line and its safety line, each team lines up, with players spaced about one metre apart. One team is Crows, the other is Cranes. When the leader calls "Crows", the Crows run for their safety line before the Cranes tag them. If the leader calls "Cranes", the Cranes run and the Crows chase them. If the leader calls "Crawfish", no one runs. The secret is to pronounce "Cranes, Crows and Crawfish" with emphasis on the "Crrrr" sound so that the players will cannot anticipate the word being spoken. Each team receives a point for every member of the opposing team tagged before that team reaches its safety line. Each team loses a point for every one of its members who runs in the wrong direction or who runs at the word "Crayfish" or who does not run at the proper call. The team with the most points after a 10-minute period wins.

Chain Dodge Ball

The players divide into teams of five or six. One team is in a line and has each player grasping the player in front around the waist to form a chain. The remaining players make a circle around the chained team. Players forming the circle pass a ball around in any manner and attempt to hit the end person of the chain with the ball. Players in the chain try to keep the end person from being bit by weaving and dodging but still keep the chain unbroken. The first player of the chain may use her/his hands to bat the ball to keep it from hitting the end person.

When the end person is hit, he/she joins the circle. Players then try to hit the new end person and continue until the entire team is eliminated. Each team in turn forms the chain or is part of

the circle. The winning team is the one that stays in the circle the longest.

Seal Tag

Players pair off. Pairs stand three to four metres apart, forming a circle with one player in front and one behind, who clasps the front player around the waist. One pair is not joined and these two players act as chasers and the one who is chased. "It" is the player who does the chasing. The player who tries to escape will attempt to get in front of one of the pairs. The front player of the pair tries to stop there. As the front player tries to aid the pursued player by holing him/her, the rear player in the pair tries to prevent this by swinging the front player away. If the player being chased succeeds in getting in front of the pair and is held by the front player, then the rear player drops away. He/she now becomes the one who is chased and must try to get in front of another pair of players. The game has two struggles: the struggle of the front and rear players of each pair, and a running match for "It" and the one being pursued. If "It" catches the chased player, they reverse roles.

Jab Relay

The equipment you need are a ball, broom handle, softball bat or a stick for each team. A ball is placed on the starting line before each team. At the signal, "Go", the first player holds the stick and jabs the ball until it crosses the finish line, about 10 metres away. He/she picks up the ball, runs with it back to the second player, and goes to the rear of the line. This continues until the ball has been jabbed across the line by the last person in the column. The team finishing is the winner.

And Next Try

Snowshoe your way to a winter or early spring cookout and at the same time search for buds, watch for tracks, or go birdwatching on a winter dayhike. Wardens can learn to lead and organize snowshoe games as part of their leadership program component.

At the Gold Tree level, Wardens can use snowshoeing as their means of travel in an extended winter camping trip.

Equipment Checklist

Use the following items as a starting point to help you get the clothes, gear, tools, equipment, food and drink that you may need for an outing. This sample list is an excellent framework for all outdoor winter activities.

Clothing

Inner Layer

- ❍ Tights
- ❍ Long-sleeved shirt
- ❍ Inner socks
- ❍ Earband
- ❍ Neck gaiter/scarf
- ❍ Thin gloves
- ❍ Balaclava

Middle Layer

- ❍ Long-sleeve, polar fleece shirt
- ❍ Polar fleece pants
- ❍ Sweater
- ❍ Outer sock
- ❍ Down/synthetic vet or jacket
- ❍ Insulated gloves

Outer Layer

- ❍ Jacket or anorak
- ❍ Over-pants
- ❍ Over-gloves or over-mittens
- ❍ Booties or gaiters/coveralls
- ❍ Hat
- ❍ Sunglasses

Equipment

- ❍ Snowshoes
- ❍ Snow poles
- ❍ Ice ax
- ❍ Waterproof sunscreen
- ❍ Maps
- ❍ Compass
- ❍ Hand and pocket warmers
- ❍ Backpack or fanny pack
- ❍ Waterproof matches
- ❍ Plastic whistle
- ❍ Flagging tape (to mark trail)
- ❍ Pencil
- ❍ Candle
- ❍ Flashlight and/or headlamp
- ❍ Extra batteries
- ❍ Flares
- ❍ First-aid kit

Tools

- ❍ Duct tape (to repair snowshoes)
- ❍ Rope or nylon cord
- ❍ Sewing kit
- ❍ Spare parts

Food & Drink

- ❍ Thermal container with 1 L water (minimum)
- ❍ dry soup
- ❍ oatmeal
- ❍ fruit
- ❍ chocolate
- ❍ nuts
- ❍ energy bars

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APPENDIX

VII

Cross Country Skiing

Adventurers
JUNIOR FOREST WARDENS

APPENDIX

Cross Country Alberta's Mission Statement

Cross Country Alberta's mission is to lead, develop, and promote the sport of cross country skiing throughout Alberta. We will accomplish our mission through quality service, leadership and skier development, responsible management, and education, thereby enhancing communities and lifestyles throughout Alberta.

Cross Country Skiing

Equipment

Canadians are great consumers of all the bells and whistles when we purchase outdoor equipment. And that seems to be the way to market a lot of ski equipment. Thankfully the needs of cross country skiing are simple and so is the equipment. Following is a short description of the equipment you will need to cross country ski. Staff at outdoor equipment stores and books will provide more detail about equipment. Shop around, ask a lot of questions and you should end up with the best equipment for your skill level.

Skis

There are three basic types of cross country skis available: racing, light touring and touring. Racing come in widths from 5.3 to 5.9 cm. They are fragile and may break in crust and deep snow. Touring skis are the heaviest and widest, ranging from 7.3 to 8 cm. They are used in deep snow and when the skier is carrying heavy backpacks. They require a more sturdy binding. Light touring is generally what most of us use for recreation skiing. The skis are about 6.5 cm wide and light enough for the efficient "rattrap" binding.

Wood has been used for cross country skis for over 2,000 years. Wood is stronger in flexure than any other material, they hold the wax better and seldom break. There are several makes of so-called waxless skis. These skis rely on specially grooved or fur-stripped bottoms in order to stop backsliding. They work but have their own set of problems, for example, grooved skis are noisy and fur tends to ice up.

A light touring ski should be 30 cm longer than you are tall. A touring ski can be shorter because it has more surface area.

Bindings

The "rat trap" type of binding is the best, it binds at the toe. Your binding should also include a plastic plat to prevent balls of snow sticking under your feet. There should also be a heel popper, which allows you to set your heel into the ski when turning. This is usually a simple serrated alloy plate.

Boots

Boots should be light and comfortable when you are wearing a light pair and regular pair of wool socks. You should be able to wiggle your toes without the heel lifting. The boots will

feature a moulded sole, which is standardized to fit the two or three pin "rat trap" binding. Boots can be lined or unlined. If you tend to get cold feet, lined boots may be the best choice.

Poles

Ski poles should be light and inexpensive. Poling is only 15% of your effort in skiing. Bamboo poles are the least expensive. If one breaks while on the trail, you can splint it using a branch and black plastic tape you carry along with you.

The handles should be tapered at the upper end so you can grasp it lightly and in a relaxed follow-through. The leather strap should be adjustable so the pole can hang from your wrist during this maneuver. The snow baskets should be small. Large baskets are unwieldy and make it hard to whip the pole forward.

Pole Length: The pole should reach under your armpit when standing in your ski boots without skis. If the poles are too long, you will have difficulty climbing hills with it, because your leverage angle will be too shallow.

Clothing

Most beginner skiers are amazed how warm they get skiing on the coldest of days. The reason is simple, as you ski you increase your circulation. This means that you need an adjustable clothing system. Dress in layers so you are able to adjust your temperature. As you get warm, take off a layer and put it in your pack. As you get cool, for example when you stop for lunch, you will put on more clothing.

Gloves or mitts are a personal preference. Gloves are better for gripping the poles because on the back swing the pole is held with the thumb and index finger. If you suffer from circulation problems with your hands, wear mitts, they won't make that much difference.

Whenever possible, wear wool. It's an excellent material for socks, shirts, hats and sweaters. Outer wear can ideally be made from synthetic materials which are light and wind proof.

If your ego can stand it, dress properly--not fashionably.

Cross Country Canada Youth Program

Jackrabbit Ski league is a program of Cross Country Canada.

Program Name	Age level	Skills	Emphasis
Bunnyrabbit	4 to 6	Yellow to Green Badges	Balance on skies
Jackrabbit	7 to 11	Orange to Purple Badges	Instruction
Racing Rabbits	9 to 12	Purple to Gold Badges	Racing
Challenge	12 to 18	Purple to Gold	Variety of skiing activities

Below are the skills required at each badge level. The skills will give you an idea of the skills and the progression level.

Green

Ready position
Falling and rising
Star Turn
Side Step
Ski walking without poles
Herringbone

Yellow

Ready position
Falling and rising
Star Turn
Side Step
Kick Turn
Straight Running
Herringbone
Free Skate
Diagonal Stride
Braking Snow Plow

Orange

Double Pole
Step Turn
One-step Double Pole
Free Skate
Diagonal Stride
One Skate
Kick Turns
Skate Turn
Marathon Skate
Diagonal Skate
Braking Half Snow Plow
Snow Plow Turn

Red

Double Pole
Snow Plow Turn
One-step double pole
Step Turn
Diagonal Stride
Kick Turn
Free Skate
Marathon Skate
Diagonal Skate
Offset Skate
Straight Running

Endurance:
Classic 10 minutes
Skating 5 minutes

Blue

Step Turn
Telemark Straight Running
Parallel Side Slipping
Snow Plow Turn
Diagonal Skate
One Step Double Pole

Endurance:
Classic 15 minutes
Skating 10 minutes

Purple

Diagonal Stride
One Step Double Pole
Diagonal Skate
Marathon Skate
Two Skate
Step Turn
Telemark Turn

Endurance:
Classic 20 minutes
Skating 10 minutes

Bronze

Diagonal Stride
Uphill Diagonal Stride
Double Pole
Classic Change-overs
One Skate
Offset Skate
Skating Change-overs
Step Turn
Linked Telemark Turns

Endurance:
Classic 30 minutes
Skating 15 minutes

Silver

Two Skate
One Skate
Skating Change-overs
Diagonal Stride
Uphill Diagonal Stride
Double Pole
One Step Double Pole
Parallel Skid Turn
Classic Change-overs

Endurance:
Classic 30 minutes
Skating 15 minutes

Gold

Diagonal Stride
Double Poling
One Step Double Poling
Classic Change-overs
Uphill Free Skate
Offset Skate
Two Skate

Endurance:
Classic 30 minutes
Skating 15 minutes

Awards
speed
distance
special

There are also three awards: Speed awards, distance awards and special awards.

Speed Awards are available for 10, 20, 30, 40, 50, 60, 70 80 and 85 minutes.

Distance awards are available for 10, 25, 50, 75, 100, 150, 200, 250, 300, 400 and 500 kilometers skied in one year. Distance awards are to recognize annual distance skiers.

Special Awards include:

Racer - Participate in two inter-club or Division races during one ski season.

Touring - Ski 20 kilometers in a supervised tour.

Challenge: Purple technique badge and Distance 350 kilometers or more.

Starting a Cross Country Ski Club

Junior Forest Warden clubs may join Cross Country Alberta as a cross country ski club. Your club must meet the requirements outline in the CCA by-laws. Once your club is registered, clubs and members have access to CCA programs, information (including newsletter) and insurance coverage. As a member of a registered CCC Club, you automatically receive second and third party Liability insurance for your activities as a leader of an approved club program.

Skier development programs begin with the Jackrabbit program, developed by the national governing body, Cross Country Canada (CCC), and delivered on a club basis. Jackrabbit leader manuals are available from CCA for $35 for non-association members and $25. For CCA members. Jackrabbit leader courses are run throughout the ski season for a $50 fee which includes two days of instruction and a manual.

Going It Alone

If you decided to teach cross country skill on your own, below is a list of skills that may help you start.

Beginner Level Skills

- Ready Position
- Falling and Rising
- Start Turn, Kick Turn, Side Step
- Ski Walking without Poles
- Herringbone

- Free Skate and Diagonal Stride
- Braking Snow Plow
- Straight Running
- Clothing and Cold Weather Safety

Intermediate Level Skills

- Double Pole and One-step Double Pole
- Braking Snow Plow and Snow Plow Turn
- Step Turn
- One Skate and Offset Skate
- Skate Turn
- Basic Waxing

Waxing Skis

Never let your dog lie on your freshly waxs skis, the fur will wreck your glide.

Waxing is part of the sport of cross country skiing. It has a mystique about it but it is really very simple. Waxing is fun and has been compared to cooking, especially if you exchange recipes or waxing secrets. You'll have days where you'll feel like you have wings on your feet or lead boots on other days. Lead boots are skis with the wrong wax applied.

To achieve best easiest results in waxing, pick one brand of wax and stick to it (no pun intended.) In this section, information about Swix waxes is presented.

Waxes should be applied, on an average, every time you go skiing. It depends on how much skiing has been done with the previous wax application and if it needs to be changed to suit the changing snow conditions and temperatures.

When ski touring, it is a good idea to carry extra waxes with you plus a scraper and applicator. The snow conditions may change during the day, which will require a change in wax.

Use a gloved hand, make a snowball and examine it.

Dry snow falls away in flakes.

Moist snow packs and holds together.

Wet snow shows water on the surface.

Swix Hard Waxes for Powder Snow

Color	Snow Temperature
Polar	-15° C to -30° C
Green Special	-10° C to -15° C
Green	-7° C to -13° C
Blue Special	-5° C to -9° C
Blue	-3° C to -8° C
Blue Extra	0° C to -7° C
Violet Special	0° C to -1° C
Violet	0° C
Violet Extra	0° C to +1° C
Red Special	-1° C to +2° C
Red	0° C to +3° C
Red Extra	+1° C to +3° C

Waxing Hints for Hard Waxes

When in doubt between two waxes, always apply the hardest (wax for the lowest temperature) first. Softer waxes can be applied over harder waxes, never the opposite.

- For extreme cold weather use Special Green or Polar wax.
- For dry to wet snow conditions, a two way combination is best. First apply a layer of Blue. If you back slip add a thin layer of Violet in the middle third of the ski (the higher the temperature the thicker the layer.)

Waxing Hints For Klister Waxes

- Icy conditions: Use Blue klister (a thick layer is best)
- Icy to wet snow conditions: Violet klister
- Wet dirty old snow conditions: Red klister
- Soaking wet conditions: Yellow klister (a thin layer is best)

When in doubt apply the klister in a thin rather than thick layer.

Skis with Synthetic Base Need Waxing

Correctly waxed skis will have the best glide and grip performance. A thin layer of Swix Base Binder, if applied first, will make final waxing more durable and also result is a better grip. Synthetic based skis need a bit more wax in the mid-section.

Swix Universal Line of Waxes

The Swix Universal line of waxes is designed specifically with the recreational skier in mind. One wax for dry snow, one wax for wet snow, one glide wax, and one klister for refrozen snow.

Grip Waxes

Blue (dry)

Blue wax is for dry snow, with air temperature of 0° C and below. Use Blue if you can't make a snowball with the snow. Apply starting from 10 cm behind the heel plate, extending approximately one metre toward the tip.

Red (wet)

Red wax is for wet snow, with air temperature of 0° C and above. Use Red if you can make a snowball with the snow. Apply starting about 10 cm behind the heel plate, extending approximately .75 metre toward the tip.

Glide Wax

Universal Glider

To improve the gliding performance of your skis, rub and cork on a layer of Swix Universal Glide Wax on tips and tails where the grip wax is not applied. This wax works on all types of snow from -5° C to +10° C.

Klisters

Universal Klister

This is used for a very wide range for coarse-grained, old, frozen snow and wet spring snow. Use the air temperature in shadow is -5° C to +10° C.

Also available is the Universal Silver Klister that resists dirt better and is lightly harder than the Universal Klister.

Apply klister in a herringbone pattern on each side of the groove. Smooth to an even layer with a scraper. Apply starting 10 cm behind the heel plate, extending approximately .75 metre toward the tip.

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APPENDIX

VIII

Supporting Resources

APPENDIX

Supporting Resources

Jackrabbit Program Leader Manuals. Available from CCA, 11750 Groat Road, Edmonton, Alberta T5M 3K6 Cost: $35. for non-association members and $25. for CCA members.

Internet Addresses

Cross Country Canada (CCC)
http://canada.x-c.com/

Cross Country Alberta (CCA)
http://www.xcountry.sport.ab.ca/

Books

The Backpacker's Field Manual: A Comprehensive Guide to Mastering Backcountry Skills. Rick Curtis. Three Rivers Press. New York, New York: 1998. 374 pages ISBN 0-517-88783-5. Cost $21.00

This is a great book full of comprehensive information about trip planning, equipment, cooking, nutrition, first aid, navigation, wilderness travel safety, no trace hiking and camping, hygiene and water purification, and weather.

Be Expert With Map & Compass: The Complete Orienteering Handbook. Björn Hjellström. Simon & Schuster Macmillan Company: New York. 1994. Table of Contents, Glossary, Index. 120 pages. ISBN 0-02-029265-1.

This book includes everything a beginner needs to know about orienteering. It covers the following topics: map symbols, travelling by map alone, compass alone and by map and compass together; finding bearings; sketching maps; travelling in the wilderness.

The Cactus Guide to Outdoor Cooking.Written and compiled by Phyllis McBride.
4332 Brisebois Drive NW, Calgary, Alberta T2L 2G2. 72 pages Available for $8.00

Phyllis McBride, a member of Alberta Junior Forest Wardens Alumni, compiled this book. It contains information on the following topics: trip planning guidelines, methods of cooking, steps to safer food, food storage, Canada's Food Guide, kitchen conversions, equivalents, suggested menus, food purchasing for 100 people, weekend camp for 30 to 50 people, recipes for breakfast, soups and salads, lunch and supper, and breads and desserts.

Camping Made Easy Micheal Rutter. The Globe Pequot Press: Old Saybrook, Connecticut. 1997. ISBN 0-7627-00433-2. Table of Contents, Index. 301 pages.

This is a practical and informative book about the many aspects of camping. It is good reading for inexperienced campers and will help anyone get interested and started. It includes information on equipment (sleeping bags, sleeping pads, tents, packs, cooking gear, knife, hatchet, saw, flashlight and lantern), dressing for the outdoors, rain gear, footwear, setting up camp, planning a trip, low-impact camping, campfires, cooking, water, camping with children, if you get lost, canoe camping, mountain biking, trailer camping, and fishing.

Edible and Medicinal Plants of the Rocky Mountains and Neighbouring Territories Terry Willard. 1992. ISBN 0-9691727-2-9 Published and available from: Wild Rose College of Healing, Ltd. 302, 1220 Kensington Road N. W., Calgary, Alberta T2N 3P5.

This is an excellent book full of information and coloured photographs with approximately 150 major species of medicinal and edible plants. This is an excellent field guide helping beginners to easily identify plants. It also includes collecting techniques and definitions.

The Essential Wilderness Navigator David Seidman. Ragged Mountain Press: Camden, Maine. 1995. ISBN 0-07-05323-3. Table of Contents, Index. 160 pages.

This is another good book about navigating in the backcountry. It contains information with the following chapter topics: a sense of direction; maps; compasses; navigation; looking to nature for clues; and extreme environments.

Leave No Trace: Minimum Impact Outdoor Recreation. Will Harmon. Falcon Publishing Co. Inc: Montana. 1997. ISBN 1-56044-581-5 (pbk) Table of Contents. 119 pages.

This is a pocket-sized book that can be carried on the trail. It covers the importance of leaving-no-trace, the principles of leave-no-trace behaviour, techniques, and leave-no-trace guidelines for different types of recreation and special environments.

Northern Bush Craft. Mors L. Kochanski. Lone Pine Publishing. Edmonton, Alberta. 1987. 287 pages and a color photo supplement.

This in an excellent resource full of information on such topics such as firelighting, axe, saw and knifecraft, making cordage, shelters, trees, the moose and the Varying hare. Every Warden should have a copy of this book.

Staying Found: The Complete Map and Compass Handbook June Flemming. 2nd edition. Published by The Mountaineers: Seattle, Washington. 1994. ISBN 0-89886-397-X 158 pages. Cost: $14.50

This is a good book enabling the reader to easily learn map and compass. It includes the simplest ways to plan routes and find your way through the trickiest terrain. It includes instructions for reading various types of maps, determining "true" directions, following bearings, backbearings and baselines, using nature as a guide, and coping if you are really lost.

Recipes for Roaming: Adventure for the Canadian Rockies. Astrid Blodgett, Brenda McIntyre, and Janet Pullan. Babes in The Woods Press, Spruce Grove, Alberta. 1996 ISBN 0-9680996-1-0. 104 pages. Cost: approximately $13.95

This is a great cookbook full of ideas and recipes for light-weight cooking in the outdoors. It may help Wardens plan meals for outings. It is spiral bound and 14 cm X 22 cm.

Tom Brown's Field Guide to Wilderness Survival. Tom Brown Jr. Berkely Books, New York. 1983. ISBN 0-425-07702-0. 287 pages.

The author is a famous tracker and hunter taught by an Apache elder named Stalking Wolf. He disappeared for a year in the wilderness with only a knife, where he honed his skills . He presents them well in this book. It covers topics such as attitude, shelter, water fire, plants, animals (trapping, fishing, skinning, cooking and preserving), tools and crafts. This is a must read for those interested in survival.

Videos

Bush Survival Tape Series.

The four in the series are: Building a Super Shelter, Making Cordage, Kindling and Fire Building, Matchless Fire by Friction. Starring Mors Kochanski. Available from Karamat Wilderness Ways, 12137 - 85 Street Edmonton, Alberta T5B 3G5, Tel: 464-5405. Costs: $30.00 a tape or $105. For all four tapes, add GST and $5 for S & H. These are also available for borrow from your Regional Coordinator.

- **Building a Super Shelter**

One of the greatest challenges in survival is the construction of an efficient shelter adaptable for four season use. This video demonstrates the construction of a shelter that is adaptable for year-round use. Common misconceptions such as sleeping on the ground are discussed and dispelled based on extensive experience. The shelter is an evolutionary compilation and distillation of 30 years of experience in the bush. This shelter works.

- **Making Cordage**

A serious bottleneck in survival in the bush is making cordage to be used for binding. If unexpectedly caught in the bush, and string or cord is not at your disposal, most people would be hard pressed if no alternative could be found. Such simple tasks as building a shelter together or setting a snare would be impossible. In this video, demonstrations of how to produce your own cordage are made using commonly found materials in the bush. Grass, bark, and cattails are used to produce snare cord and thicker cordage for heavier uses.

❍ **Kindling and Fire Building**

It is said that a person can survive in the bush wet and warm but not cold and dry. The first priority in survival is to build a fire for warmth if the environment is cold. In this video, various types of kindling such a birch bark, resin, other barks, and twig bundles are discussed and their use demonstrated. Where they can be found and their proper gathering is shown. Wet weather techniques are also discussed. Making feather sticks, an important aid in wet weather, is presented, as well as the use of the incredible zirconium rod in fire lighting.

❍ **Matchless Fire by Friction**

You probably have heard of building a fire by rubbing two sticks together, but question whether it can really be done. In the non-desert environment it is not quite that simple, but given the right tools and the techniques discussed in this video, anyone can learn to produce a fire if caught without matches in the bush. This video discusses what to look for as tools, how to prepare them and their proper use. An actual fire is started on this video using these techniques.

Miscellaneous

Basic Knots Deck of Cards. Available from Ynot Us International, Inc. 28-51420 Range Road 270, Spruce Grove, Alberta T7Y 1G5. Cost approx. $6.99 add $1. For postage and handling per deck.

The following basic knots are illustrated on the cards. Angler's Loop, Artillery Loop, Barrel Loop, Bill Hitch, Bowline, Bowline on a Bight, Bowline for climbers, Bowline on a ring, Branch Knot, Carrick Bend, Cat's Paw, Chain Sinnet, Clove Hitch (pole, post, ring), Constrictor Knot, Cow Hitch (post, ring), Double Fisherman's Knot, Double Overhand Bend, Dropper Loop, Figure-eight Knot, Fisherman's Bend, Half Hitches, Hangman's Knot, Heaving Line Knot, Highwayman's Hitch, Hunter's Bend, Japanese Bend, Jury Mast Knot, Knotted Sheepshank, Loop on the Bight, Loop Knot, Multiple Clove Hitch (pole, post), Multiple Overhand Knot, Multiple Sheet Bend, Noose, Overhand Knot, Portuguese Bowline, Reef-square Knot, Rolling Hitch, Sheepshank, Sheet Bend, Spanish Bowline, Sturgeon's Knot Bend, Swivel Hitch, Tarbuck Knot, Thief Knot, Three-part Crown, True-lover's Knot and Water Knot. A deck of these cards would be a great asset on a trip. Have Wardens practice their knots in the tent when it's raining or around the campfire.

Web Sites Worth Exploring

Cooking Clan of the Cave Bear Style!
http://www.wynja.com/arch/cooking.html

Food
http://www.gorp.com/gorp/food/recipe.htm

Hiking Resources
http://www.campfirefoods.com/links.html

Knots on the Web
http://www.earlham.edu/~peters/knotlink.htm

Map and Compass
http://www.usgs.gov/fact-sheets/finding-you-way/finding-your-way.html

Scouting Recipes
http://www.isd.net/srtobin/sc-cook.html

Solar Cooking Archive
http://www.accessone.com/~sbcn/index.htm

Ultralightweight Backpacking
http://ourworld.compuserve.com/homepages/rwgross/ultrahow.htm

The World Wide Web's Knotty Index
http://www.geocities.com/Yosemite/2158/knotix.htm

E-mail

Mountaineers Books
(Ask for a free catalog with 350 titles on climbing, hiking, mountain biking, paddling, backcountry skiing, snowshoeing, adventure travel, natural history and conservation, and many more titles on how-to books to sharpen outdoor skills.)

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